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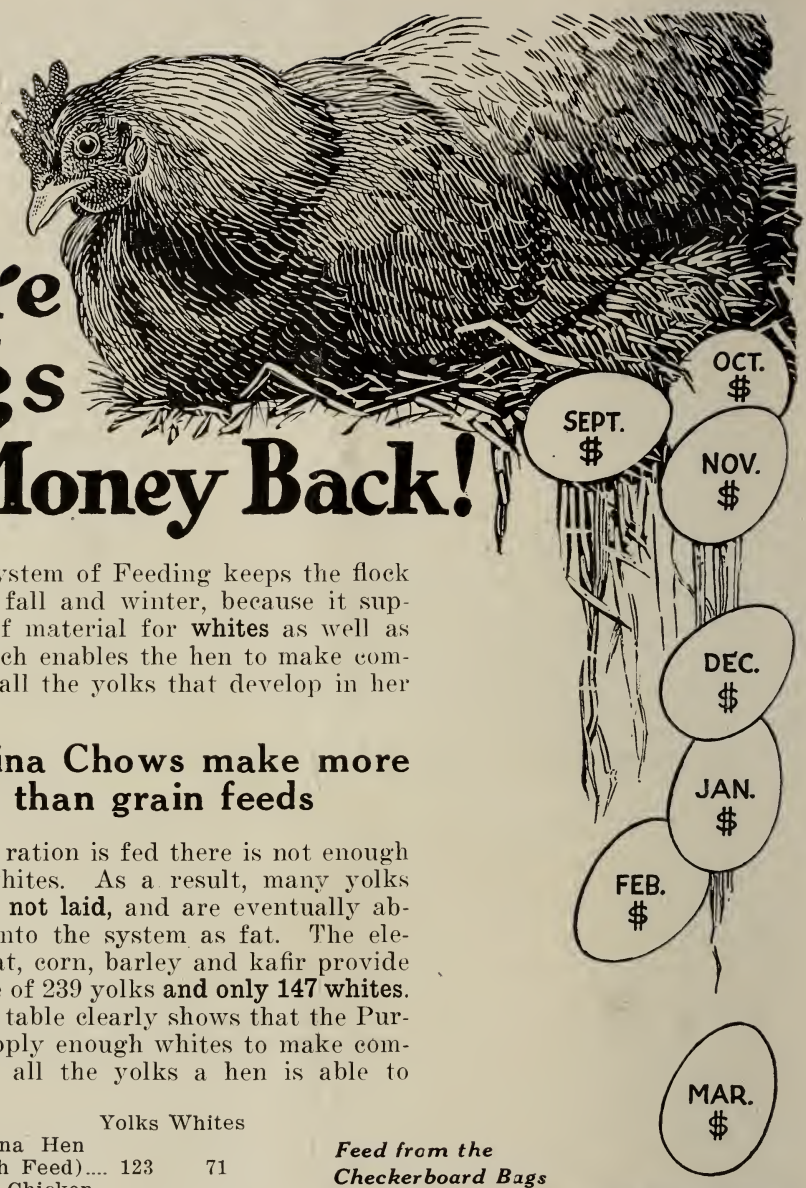
The PURDUE AGRICULTURIST

OCT 7 1920

OCTOBER, 1920

Vol. 15 No. 1

More Eggs or Money Back!



The Purina System of Feeding keeps the flock laying in the fall and winter, because it supplies plenty of material for **whites** as well as for yolks, which enables the hen to make complete eggs of all the yolks that develop in her body.

Why Purina Chows make more eggs than grain feeds

When a grain ration is fed there is not enough protein for whites. As a result, many yolks that form are **not laid**, and are eventually absorbed back into the system as fat. The elements in wheat, corn, barley and kafir provide for an average of 239 yolks **and only 147 whites.** The following table clearly shows that the Purina Chows supply enough whites to make complete eggs of all the yolks a hen is able to produce.

	Yolks	Whites
50 lbs. of Purina Hen Chow (Scratch Feed)....	123	71
50 lbs. of Purina Chicken Chowder	91	141
100 lbs. of Combined Ration (fed half and half)	214	212

More Eggs Guarantee

"The money paid for both Chows will be refunded if hens when fed Purina Chicken Chowder with Purina Hen Chow, as directed. do not lay more eggs than when fed any other ration."

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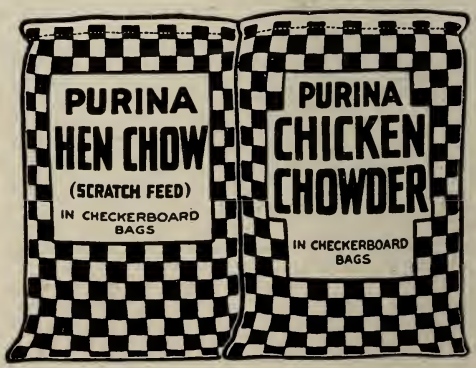

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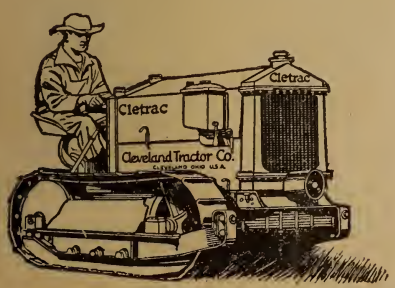
HARD THIS WAY
BUT—

EASY ON A TRACK
THE CLETRAC WAY

Parable of the Wheelbarrow

PROGRESSIVE farmers everywhere are turning to the all-purpose, tank-type Cletrac. The reason is plain—the "Cletrac Principle." Here's an illustration that explains it.

The man at the left finds his heavily loaded wheelbarrow stalled in the soft earth. He does the natural, *sensible* thing—lays a track of boards over the loose ground.



The weight of the load is now distributed over the broad surface of the boards and he no longer wastes energy in pushing *against* the soil.

This simple parable illustrates the "Cletrac Principle."

The Cletrac lays its own board-like tracks over any footing. All the weight is distributed over 800 square inches of tractive surface. So, just as in the case of the wheelbarrow on the boards, there's no power wasted in "pushing out of the rut."

We'll gladly furnish you with material that tells you the complete story of the Cletrac.

The Cleveland Tractor Co.

"Largest Producers of Tank-Type Tractors in the World"

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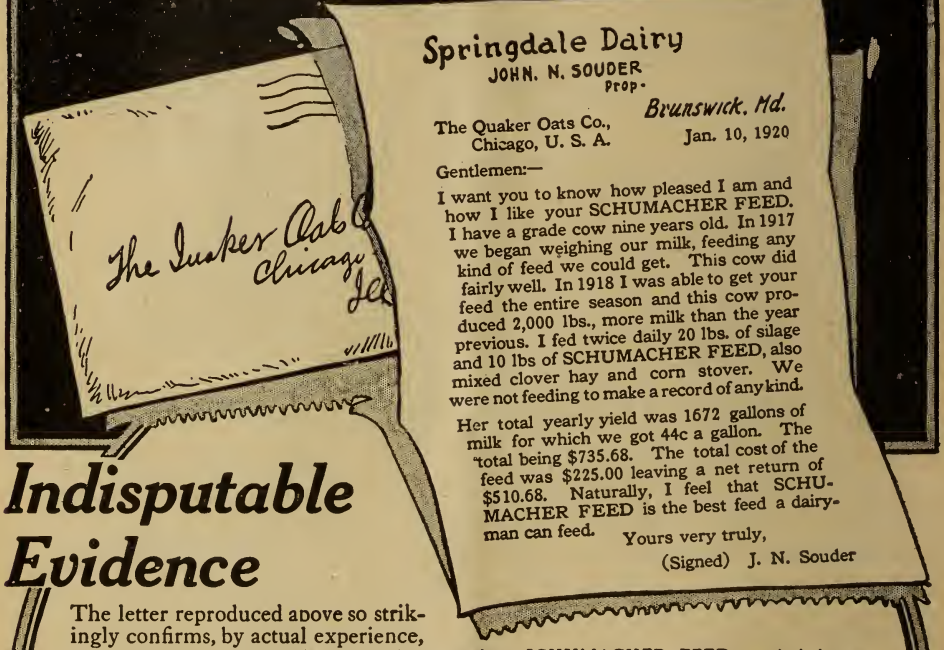
$735.68 Milk From A Grade Cow in One Year



Springdale Dairy
JOHN. N. SOUDER
Prop.
Brunswick. Md.

The Quaker Oats Co.,
Chicago, U. S. A.

Jan. 10, 1920

Gentlemen:—

I want you to know how pleased I am and how I like your SCHUMACHER FEED. I have a grade cow nine years old. In 1917 we began weighing our milk, feeding any kind of feed we could get. This cow did fairly well. In 1918 I was able to get your feed the entire season and this cow produced 2,000 lbs., more milk than the year previous. I fed twice daily 20 lbs. of silage and 10 lbs of SCHUMACHER FEED, also mixed clover hay and corn stover. We were not feeding to make a record of any kind.

Her total yearly yield was 1672 gallons of milk for which we got 44c a gallon. The total being $735.68. The total cost of the feed was $225.00 leaving a net return of $510.68. Naturally, I feel that SCHUMACHER FEED is the best feed a dairyman can feed.

Yours very truly,
(Signed) J. N. Souder

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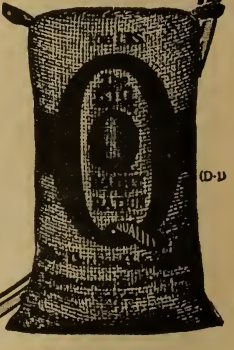
SCHUMACHER FEED

is a feed you cannot afford to overlook. Check up your cows—your feed costs and see if they show a big yearly profit. ***Start Now***—feed SCHUMACHER FEED—not for a week or a month, but for the entire lactation period of your cows and you will feel as Mr. Souder does, THAT IT IS "THE BEST FEED A DAIRY-MAN CAN FEED."

SCHUMACHER FEED AND BIG "Q" DAIRY RATION

are IDEAL feeds for dairy cows. SCHUMACHER FEED supplies the carbohydrate or maintenance part of the ration and BIG "Q" the protein concentrate portion. Ask your dealer for them. If he cannot supply you, write to us.



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The Quaker Oats Company

Address: Chicago, U. S. A.

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Entered as second class mail matter December 4, 1906, at the Post Office, LaFayette, Ind., under the Act of Congress of March 3, 1879.

Subscription Price, Fifty Cents Per Year. **Advertising rates sent on application.**

A pure-bred sire.

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The Purdue Agriculturist

VOLUME XV OCTOBER, 1920 NUMBER 1

Keep the Draft Colt Growing All the Time

By Professor Krueck.

AFTER a lapse of a few years horsemen found a good market for their draft horses last spring. Buyers scoured the country collecting horses for eastern shipment and good, sound drafters were always at a premium.

One cause for the scarcity and shortage of good drafters was the slow market that we have had during the last few years. This in turn was also responsible for a poorer class of horses for the market last spring, because farmers and breeders lost interest in their horses and consequently did not care for them as they had done in the past.

Although many stallion and jack owners expressed more interest in horse breeding this year, the fact still remains that the foal crop for this spring was light, and the foal crop next spring will not reach a normal production basis.

Those who have been fortunate enough to produce foals this year cannot afford to carry these youngsters along on nothing more than a maintenance ration as has been so commonly done in the last few years. If the mare owner has a colt on his hands simply because he bred the mare to keep her quiet, then he may be justified in handling his colts in "slip shod" way. But the man who has patronized a good horse and has a good foal can afford to give that foal more than the run of a stalk field for food and shelter during the coming winter.

One common fault with many colts at present is the condition of the feet and legs. This to the prospective buyer is important, for we all realize that a horse without a foundation will not "stand the racket." Undoubtedly a great many ill-shaped pasterns, straight upright hoofs, "crusty" hoof heads, etc., are caused by lack of attention to the growing foot. Many toppy pure-bred mares are bad in this respect at the present time and the good, clean, sound ones are hard to find. Trimming the feet often and giving particular attention to removal of hoof—that will help keep the foot balanced and the pastern properly set will help to put better pillars under our draft horse stock. Blacksmiths ordinarily trim the wall of the foot down so that it is smooth and even with the sole of the foot. However, if the colt is inclined to tip outward upon his pasterns, the outer wall of the foot should not be trimmed down to the sole but should be left a little higher than the inner wall, so that the tendency will be to straighten the ankle. Allowing the heels to become very long and high has a tendency to cause more wear on the toe and consequently is likely to result in "cocked ankles."

At no time in the life of the horse will growth be obtained more economically than while the colt is still under a year of age. The breeder will therefore do well to see that the youngster is kept growing continually. A supply of good clover or alfalfa hay will help to reduce the amount of grain necessary and will furnish bone and muscle building material. It also helps to develop the digestive system, a very essential feature in a good drafter. Making part of the roughage allowance good clean oats straw may reduce somewhat the cost of maintenance.

The grain ration should be made up of the feeds available at the most reasonable price, keeping in mind, however, the most desirable results with the colt. Good oats are usually considered one of the standard feeds for horses. If good bran is available this can be added to the oats with very desirable results. It will help furnish the phosphorus that is needed by the growing youngster. If corn is fed the ration will also be materially improved by the use of

A vigorous, well-developed foal; the result of good breeding and care.

bran. A little oil meal, if not too expensive, will help tone the systems and will ripen the appetites when they begin to "lag." If good molasses can be purchased two pounds per day diluted with water and mixed with the grain is very valuable along in the late winter when paddocks are slippery and colts lose their appetites because of lack of exercise. This is especially desirable with good pure-bred colts.

Good clean water should be available at all times and the feeding and watering should be done regularly.

If fed in lots the feed throughs should be large enough to avoid crowding and consequent injury to some of the youngsters. Old boards, rails and obstructions upon which the colts may hurt themselves should be removed from the lots. If the fences are of wire all straggling ends should be fastened securely to avoid blemishes caused by wire cuts.

It always pays to have the youngsters tame, so that they can be caught and haltered easily. Horses that are accustomed to being handled always sell better when a buyer comes to see them. They are much easier to feed and care for especially if they are being stall fed. And when they get caught in fences or other obstructions they are usually less likely to hurt themselves.

To sum up the substance of this article never allow the colt to stop growing, never allow him to go hungry or thirsty, keep him free from insect and disease pests, and never allow him to fear his feeder and master.

POULTRY MEN HOLD MEETING AT PURDUE.

Fifty-eight members and thirteen visitors of the American Association of Instructors and Investigators in Poultry Husbandry assembled at Purdue University August 16, 17, 18 and 19th for their twelfth annual convention.

Delegates were present from Ottawa and Ontario, Canada; Manila, Philippine Islands; Corvallis, Ore.; Storrs, Conn.; West Raleigh, N. C., and Lexington, Ky.

The full sessions were held daily. Prof. G. I. Christie gave the address of welcome. A banquet was given at the Acacia house on Thursday evening, August 18.

A daily journal, known officially as the Poultry Journal, was published throughout the convention.

Practically all of the hardy bulbs may be planted any time from the first of October until the ground is frozen. The ground should be well spaded and the bulbs planted comparatively deep; for example, three inches for tulips. No additional protection is needed for the hardier varieties, but some, such as hyacinths, require a covering of leaves, straw or manure during the coldest part of the winter.

Maintaining the Laying Flock

By Roy E. Roberts, '21.

IN order to make his business a success, especially under present conditions of high prices for feed stuffs, labor, and other expenses entering into egg production, the poultry raiser must not only secure the maximum egg yield and at the same time as many of these eggs as possible during the winter months when prices are highest, but he must also maintain his flock and do all in his power to increase the productive capacity of the flock as a whole. In order to do this he must practice careful culling, retaining those high producing birds which return a profit and disposing of the low producers which show a loss.

From a study of trap nest records a method has been devised by which the high producers can be distinguished from the low producers with a great degree of accuracy. This method is based upon certain external characteristics which enable any poultry raiser to distinguish the good from the poor producers.

The poor producers lay nearly all of their eggs in the spring and early summer, while the high producers continue to lay long after the poor producers have stopped. If only one culling is made, the best time to make it is in August or September, as at that time the poor producers have stopped laying for the season, while the high producers are still laying. However, it is advisable to make two cullings. The first culling should be made when summer egg production begins to decline. This may occur as early as June in some of the poorly bred and poorly fed flocks and not until September or October in some of the best flocks. This first culling will remove the real loafers, which as has been found in the culling demonstrations carried out by the Purdue Extension Department this summer averages about 20 per cent of the flock. The second culling can follow a month or six weeks later and will separate the medium from the best layers.

Late Molter. Trap nest record 187 eggs. Photo taken Oct. 1st, showing old plumage. This hen stopped laying Nov. 23, beginning again Jan. 2.

In culling the flock the factors to be considered are the time of molt, certain body changes, and in the case of yellow skinned breeds, loss of skin color. When a hen stops laying she usually starts to molt, and since the longer a hen lays in the fall the greater is her egg production, the late molters are the heavy producers. Early molters will show new feathers in the primaries of the wings before the late molters will and therefore those birds should be kept which show the most old feathers in the primaries during August and September. A warm, full, red comb indicates heavy production, while the comb tends to dry down and a white scurf usually forms after the hen stops laying. The vent is large, moist, and dilated in the layer, but hard, small, and puckered in the non-layer. In the layer the abdomen is spread and is soft, and the pelvic bones (also called pin or lay bones) are usually free from fat, thin, and pliable and from two to four fingers apart, while in the poor layer the abdomen is contracted and hard and the pelvic bones are usually fat, thick, and rigid and almost closed together. The vertical distance between the pelvic bones and the rear of the breast bone is usually four to six fingers in the layer and two to three fingers in the non-layer. In the case of yellow skinned breeds the yellow pigment stored up in the shank, beak, and skin fades out during the period of laying. With the first few eggs laid the color around the edge of the vent will fade. Next the eyering (inside edge of eyelids) will fade, and in Leghorns the earlobes will fade at about the same time. The beak fades from the base outward, four to six weeks of heavy production being necessary to fade all the yellow from the beak. The shanks fade slowly, fifteen to twenty weeks of production being necessary to remove all the yellow from the shanks.

Early Molter. Trap nest record 43 eggs. Photo taken Oct. 1st, showing mostly new plumage. This hen had been well fed yet stopped laying in June. She was sold as a cull Oct. 10.

By the above method the high, medium, and low producers can be distinguished. The high producers should be leg-banded so that they can be used as breeders the following spring. Care should be taken that no bird is kept which is not strong and vigorous, of good size, and free from phy-

(Continued on page 36)

Federal Grain Supervision

By F. E. Robbins,
Associate Professor of Crop Production.

WHY have Federal Grain Supervision? Who started it and who is to be benefited by its operation? These and many other questions are asked by the farmer and others interested in the handling of grain. It is necessary first to look into the early history of grain inspection. Grain inspection as we know it today had its beginning in Chicago in 1857, being in charge of the old Board of Trade, then a mutual association. Various states took up the inspection work, and many exchanges were founded. As this was done, there came the demand for more efficient inspection service, and added protection to the rights of the country shipper. Each exchange had its own standard of grain, and with the ever increasing production, thus broadening the domestic and foreign demand, the competition became very keen. Naturally there arose much confusion among the various exchanges due to a lack of uniformity in the methods of inspection and grading of the grain.

In 1906, a Uniform Grade Congress was called at Chicago, under the auspices of the Grain Dealers' National Association. A resolution was passed to accept the invitation to cooperate with the United States Department of Agriculture's project of Grain Standardization. This was the beginning. As there was no power to enforce the use of a set of standards worked out by the National Association, they realized that there was just one power which could handle this situation and enforce the rules—that was the Federal Government. As a consequence, the 64th Congress passed a bill under the caption of "The United States Grain Standards Act," approved August 11, 1916, and provides for investigation by the Secretary of Agriculture of the handling, grading, and transportation of grain in order that he may fix and establish standards of quality and condition for corn (maize), wheat, rye, oats, barley, flaxseed, and such other grains as in his judgment the usages of the trade may warrant and permit.

This investigational work has been done under the direction of the Bureau of Markets, and standards for shelled corn became effective December 1, 1916; for winter wheat, July 1, 1917; for spring wheat, August 1, 1917; and for oats, June 16, 1919.

In order to make this effective, the United States has been divided into some thirty-six districts, with a grain supervisor over each district. These supervisors keep in close touch with all licensed grain inspectors with their district, helping them to apply the standards in a uniform way. The supervisors in turn keep in close communication with the General Field Headquarters at Chicago. As a result, for the first time in the history of the grain work a uniform standard for corn, wheat and oats is being applied.

The question may well be asked, How does this affect the farmer? It is true that at present he is affected only indirectly, but as he becomes more familiar with its operation he will more and more reap its benefits. It will mean that if Farmer Jones raises a better quality of wheat, puts it on the market with a minimum percentage of dockage, he is going to be paid for a higher grade of wheat than Farmer Smith who raises wheat of poor milling quality and a high percentage of dockage. It will also mean that the elevator man can afford to do business on a smaller margin than heretofore because he knows the grades he is handling and how it will grade when it arrives at the terminal market, and a great deal of the element of chance has been eliminated.

If there is no licensed inspector in the community and the farmer is not satisfied with the grade given him, he and the local elevator man may agree upon a given sample and send it to the nearest inspector, or pay for the services of an inspector to come and grade the grain at the elevator. Federal supervision may not take place until after the grain has first been inspected by a licensed inspector. It might be stated that grain must be inspected by a licensed inspector if it is an interstate shipment.

If there has been one factor more than another which has caused dissatisfaction among farmers, it is that of the test weight. The test weight may be made to vary from one-half pound to five pounds per measured bushel by the method of filling the kettle;

also, in the case of wheat, by weighing the grain with the dockage included, or, as is the standard method, by weighing the dockage-free grain. The farmers should acquaint themselves with the correct methods to be used and insist upon their adoption. In many cases this is not necessary, because the elevator men are willing to do everything they can to help in the standardizing of the grain they handle, and are equipping their elevators with the standard appliances.

It might not be amiss here to state that the farmers may assist materially in raising the market grade of their grain if they will cooperate in raising the same class of grain in their community; i. e., all raise some variety of the soft winter wheat class, and not some raise this kind, some spring wheat and some hard winter wheat. No local elevator can handle these classes separately, consequently many times the carload has to go as mixed wheat at a lower market price.

Many other phases of grain supervision might be taken up, but space will not permit in this article. In closing, it might be stated that while the present standards are not perfect, they are headed in the right direction and deserve the cooperation of all who are interested in the marketing of grain. No doubt changes will be made as the occasion demands, but until then let us accept the present standards as a big step forward in the interest of better marketing conditions.

Doings of the Dairymen

By A. C. Boltzer.

Dearborn County, Indiana, has taken a step forward that will put it prominently on the Jersey map of the United States. Five pure-bred Jersey bulls have been purchased by the farmers of Moores Hill and vicinity. These five pure-bred Jersey sires will be used co-operatively among forty-eight farmers on a total of 243 cows. It is hoped that through the exchange of these five sires at two years' intervals ten years of breeding operations can be carried on.

The quality of sires selected by the Dearborn County Jerseymen is high. A standard of five hundred pounds of butterfat was set as a minimum production for the average of the three nearest dams to each bull. In two of the bulls selected, records only were possible on two dams, the granddams on the dam's side in both cases being imported cows. In all cases the average production of fat is above five hundred pounds.

All five of the Association sires are of the Owl Interest family of Jerseys. One eighteen-months-old bull was found in this state at Mr. J. A. Driscol's farm at Liberty, Ind. The dam of this bull is Arletta of B. V. F., which made as a four-year-old 10532.8 pounds of milk and 574.33 pounds of fat at an average test of 5.45. The sire of this bull is Interested Owl of B. V. F., whose dam has 521 pounds of fat to her credit with Spermfield Owl's Temesia as a grand-dam with 875 pounds of fat as her record.

The other four bulls were obtained at Mr. John R. Sibley's Moose Hill farm at Spencer, Mass. Three of these calves are yearlings and the fourth will be a year old in September. Sibley's Interested Prince, the grand-sire of the Driscol selection, is sire of one of these calves with a full brother, Sibley's Interested Owl, as sire of the third calf. Oxford Lad's Progress, present herd sire of the Driscol herd, is the sire of the fourth calf with Sibley's Choice, the sire of Mary from Sibley's Choice with a record of 860 pounds of fat and 16,645 pounds of milk, as the sire of the fifth bull.

The average production of the four dams of the bulls purchased from Mr. Sibley's herd will be above five hundred pounds of fat, two of the cows still being on official test. Our most conservative estimate is 563 pounds, including the record of a junior three-year-old. Spermfield Owl's Temesia, the second highest butterfat daughter of Spermfield Owl, appears again as grand-dam and great grand-dam with three of these bulls.

The future for Dearborn County Jersey breeders appears bright. With five young sires of a standard quality of milk and butterfat production, the increased production of the grade and pure-bred Jerseys in and about Moores Hill, Ind., should be pronounced in the next few years.

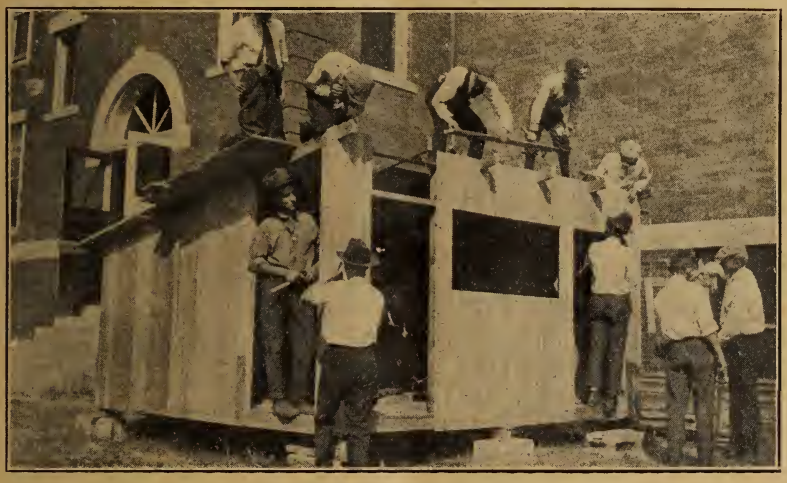
Vocational Agriculture

By G. G. Cunningham, '21.

OUR foremost educators are advocating radical changes in the methods of education and training. The college entrance requirements of today are far more flexible than they were two years ago. While the changes and substitutions have been gradual, nevertheless the needs of the various communities of the United States reflect themselves in the college curriculum. One of the newest departures promulgated, is that of giving instruction on subjects which fit the community need. The "get-together" spirit in the rural districts acts as a cement between hospitality and isolation. Human beings crave companionship, not only in a cheery greeting, but by gatherings and social functions.

The influx to the cities is reaching alarming proportions, and the problem looms up as to how this can be stopped and, if possible, start the current flowing in the opposite direction. Those of the rural places who emigrate to the city for a time, find upon their return that the country lacks excitement as compared with the metropolis. This is most probably true, for the city offers attractions that are far more diversified than those that are found in the rural sections. The progress of civilization depends upon community life, for without it we would soon become savages, whether here in our own land or in the South Sea Islands. We have come to the realization that the community is a fundamental unit of human society.

The extension service of our various state agricultural schools has organized community effort to make the most of opportunities offered. The county agent has disseminated valuable information and help to the farmer. The skeptics have finally cooperated, and have become forceful adherents of the work being done.



A vocational class at work.

The newest feature of community work made possible by legislative help, is that of vocational agriculture. Here, as in no other branch of extension work, its representative comes in direct contact with the community. He is employed as a teacher and as an advisor along agricultural lines, for when the community is purely agricultural, why should instruction, outside the fundamentals of an education, be devoted to subjects of foreign attitude? He lives with them and learns to know them intimately.

Boys and girls of township schools do not always have a chance of entering college, but through the agency of vocational agriculture they have the chance of obtaining training in matters which are of paramount importance to them for their future livelihood. Vocational teachers, upon their advent to a new district, are generally received very cordially and soon find them-

selves giving instruction to a large group of interested boys and girls. Many of them are shown the farm life in a new light and are firmly convinced that money can be made at home as well as in the city, if the right methods are pursued. The vocational teacher plans social activities, such as township fairs, and perhaps in many cases installs a motion picture machine to further his work. Various contests are planned, giving every boy and girl a chance to compete.

As each activity passes, thought of a better effort next year is uppermost in the minds of all the participants, and the lure of the city will fast fade from his vision.

Vocational agriculture is applicable to all communities, and when the demand is made directly or indirectly, the community should have its needs filled by those who have the power to fill them.

The Importance of Tomato Canning Crop Investigations

By H. D. Brown,
Associate Professor of Vegetable Gardening.

THE acreage of tomatoes in Indiana grown for the canning factory has gradually increased until, in 1919, some reports by the Bureau of Crop Estimates had Indiana credited with the largest acreage of any state. The estimates for 1920 indicate that this state will easily lead all other states this year.

The annual acreage runs from thirty to fifty thousand acres, with a valuation of about five million dollars for the packed product.

The fact that the crop is growing in importance is indicative that Indiana has some advantages as a tomato growing state. These advantages may be summarized briefly as follows: 1. It has a climate well adapted to tomato culture; 2, labor is cheaper than in many of the eastern states; 3, the natural fertility has not been badly depleted; 4, the destructive diseases and insects have not gained such a foothold as in some other states; 5, yields of wheat following tomatoes in Indiana are better than when following many other crops, making the rotation especially suitable to this state where wheat is grown extensively.

The Purdue Agricultural Experiment Station recognized the importance of the crop at an early date and has already contributed valuable information as to how certain of the above factors can be bettered. For instance, it has conducted fertilizer tests in various parts of the state and as a result of these investigations a fertilizer approximating a 2-12-6 formula is recommended for most types of Indiana soil. The figures refer to parts of nitrogen, phosphoric acid and potash respectively.

The importance of accurate cost data for growing tomatoes is recognized and several hundred cost blanks have been sent to the Indiana growers during the past two years in order to secure this information. It is hoped that the figures for this year will be as complete as possible for all tomato growing sections of the state.

The fourth factor mentioned in the above summary is in a way embodied in an extensive experiment on the improvement of tomato seed conducted through a cooperative agreement between the Indiana Canners' Association and the Purdue Agricultural Experiment Station. This project was started after this Station had found as much as four tons variation in yields per acre from seed of the same varieties secured from different seedsmen, and after the indiscriminate attempts of commercial seedsmen to buy the so-called mine run seed which came from the pulped tomatoes in our Indiana factories. Last year as a result of this project over 3,500 pounds of tomato seed were produced and sold at a very low figure to the members of the Indiana Canners' Association. Although it is certain that the goal is far from reached, we have every reason to believe that the strain of tomatoes now being produced has been greatly improved. Some idea of the magnitude of this enterprise may be obtained from the fact that the breeding plots at Lafayette require nine acres of ground and the multiplication plots at Campbellsburg

about fifty acres. The variety Greater Baltimore is used mostly in making the selections, but a number of the other important varieties are also included for improvement and selection.

To carry on this work it was found advisable to perfect better methods of saving seed, so that now the seed may be taken from the tomatoes, freed from the pulp, and dried in less than twenty-four hours' time. This is a decided improvement over the old method, where it was necessary to allow the pulp and seeds to ferment for several days.

Out of this project and others conducted by the Botany Department at Purdue has come much pathological information of a practical and scientific value which it is hoped will be published in the near future. The investigations that have been conducted by the Horticultural Department have been published in part by Purdue Bulletin No. 250 and Circular No. 57. Directions will be found in these publications for the saving of tomato seed on a small and large scale. Cultural methods of importance are also discussed in detail.

The information concerning tomatoes in the farm rotation was obtained by questionnaires sent to a number of Indiana growers. It presents another angle to the farmers in selecting their rotations.

Another item not mentioned above is that of using stocky plants at setting time and to set early, preferably before the fifth of June. The fact that such plants, set early, yield on an average of at least three tons more per acre needs no further explanation, yet these facts have been emphasized year after year with apparently little results.

Indiana Apple Show

A prize winner.

The tenth annual apple show of the Indiana Horticultural Society, to be held in the Women's Building at the State Fair grounds November 15-20, promises to be one of the best shows ever held by the society. The show this year has been opened to ten of the apple producing states of the middle west and this section, while it does not have a bumper crop this year, has a very fair crop of exceptionally fine fruit which promises to be highly colored and will make a splendid display. The prizes are exceptionally attractive, $2,700 being offered in the regular list. It is hoped to make the boys' orchard club exhibit and the girls' canning clubs an attractive feature of this show and all clubs are urged to come out and compete for the liberal prizes in this class. Entries for all club prizes are open only to residents of Indiana. Many fine special prizes have been offered, but the one which is attracting the most attention is the Stark Special of $600 worth of nursery stock offered for exhibits of Stark Delicious by Stark Bros. Nursery and Orchard Company of Louisiana, Mo. This is one of the best prizes ever offered in this show on a single variety; it is attracting wide attention and is sure to bring out a fine exhibit of this popular apple.

THE PURDUE AGRICULTURIST

Published monthly during the school year, by Agricultural Students of Purdue University, LaFayette, Indiana.

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The purpose of THE PURDUE AGRICULTURIST is to disseminate the latest scientific knowledge concerning Agriculture and Home Economics, to incite the young people of Indiana to a greater desire for training in Agriculture and in the industrial pursuits, to publish matters of interest concerning the Purdue School of Agriculture and the Purdue Experiment Station, and to afford opportunity to the students for training in Agricultural journalism.

THE NEW SCHOOL YEAR.

Once more comes the purple autumn, and again Purdue opens her doors to the three thousand students who are eagerly awaiting the opportunity of crossing her threshold of learning. Perchance some have come with indifferent aims and ideals, but the majority are earnestly seeking preparation for the serious problems and larger tasks of life.

To those who are coming for their last time, this year means much. All too soon the three previous years have passed and now remain only a few brief months in which to prepare for the demands of the busy, workaday world. To the Freshman, the University is a door into a new and larger world than he has previously known —a world wherein he may find himself and ascertain the line of work for which he is best adapted. If he comes endowed with sufficient determination and courage, he will emerge from this great melting pot four years hence an entirely different person.

College days constitute the best four years of a man's life. It is then that his capabilities are unfolded and trained. It is during these years that he dreams the biggest dreams, sees the most noble and inspiring visions, and forms the richest and most potent friendships. All the streams of life are here given impetus and direction. Every student owes it to himself first, and also to his parents, state and nation, to make this the biggest year of his life, as measured in terms of actual work done, friendships formed, and ideals and character established.

FUTURE OF THE FEDERAL FARM LOAN ACT.

In the next session of the Supreme Court that convenes October 13th, the constitutionality of the Federal Farm Loan Act, which has been inoperative since early spring, will be tested. The American Bankers' Association, which is opposed to the act because it reduces the amount of the loans that are made to the farmers and also the rate at which the loans are made, maintains that the bonds that are issued to cover the loans made to farmers through the Joint Stock Land Banks or the farmers' organizations are taxable. If they are taxable, then the rate of interest on loans will be so high that the bill will be of little benefit to the farmer. This decision will be of far reaching significance, for during the short time that this act has been operative 5,000 Indiana farmers have borrowed more than nineteen millions of dollars, and five thousand more have applied for loans. Most of these loans have been made at five, and five and one-half per cent, and none at more than six per cent, and the farmers were able to borrow this amount without paying any commissions.

The saving of interest has been only an incidental benefit to the farmers. The

greatest benefit of all from the latter's standpoint has been the provision made for long-time amortized loans. Under this amortization plan, loans are made by the Land Banks of the Farm Loan System for periods ranging from twenty to thirty-five years, and the farmer is given an opportunity to repay the principal in small annual and semi-annual payments amounting to only one per cent in excess of the rate of interest.

THE BOYS' JUDGING CONTEST.

The annual Boys' Judging Contest, held Tuesday, September 7, at the coliseum on the Fair Grounds, proved one of the best ever held. The prizes offered were divided into two general classes, those for high standing teams, and those for high scoring individuals. Thirty-six teams competed in the team contest and 145 individuals competed for individual honors. The contest was under the direct supervision of Prof. C. F. Gobble of Purdue, assisted by Professors Cooley, in horses; King, in beef cattle; Pontius, in sheep; Wiley, in hogs, and Krueck, in dairy cattle.

In the keen competition for team honors, the Blackford County team placed first with a score of 1,674 points out of a possible 2,250; Decatur and Tipton Counties tied for second with 1,607 points each; Madison came fourth and Clay County fifth.

The Blackford County team consisted of Mark W. Langdon, Chas. J. Clamme, Jr., and Vaughan Johnson, with Francis Johnson as alternate. The three team members stood fourth, sixth and ninth, respectively, in the individual scoring and the alternate stood eighteenth. This team received for a prize a $200 trophy and $100 in cash to pay their expenses to the International at Chicago in December, where they will represent Indiana in a judging contest between states. The Dearborn County team did the best work in judging dairy cows and will represent Indiana at the National Dairy show to be held at Chicago in October. This team is composed of Robert Young, Clarence Libbert, and Ralph McCardle.

The five high men in individual scoring were Lowell Beavers, of Henry County, who received a $100 scholarship to Purdue; Ernest Durr, of Tipton County, who received a $75 scholarship to Purdue; Ervin Beeler, of Wells County, who received $30 cash; Mark W. Langdon, of Blackford County, who received $25 cash; and Clarence Million, of Carroll County, who received $20 cash.

Lowell Beavers, of Henry County, received a medal for doing the best work in horse judging, and similar medals were awarded to Vaughan Johnson, of Blackford County, in beef cattle; Clarence Godfrey, of Huntington County, in dairy cattle; John Alspach, of Miami County, in hogs, and Herman Magee, of Henry County, in sheep.

This was the best contest ever held at the State Fair, both in the number of contestants and the enthusiasm shown, and is one of the very best means of enlisting the boys of the State in the cause of better agriculture.

IS YOUR FARM SUCCESSFUL?

To be considered successful, a farm should maintain or increase its fertility, and should return a reasonable wage for the labor of the farmer and his family, after paying the expenses of operation and deducting a fair rate of interest on the investment. The four most important factors affecting the success of a farm are: size of business, yield of crops, returns from livestock, and efficiency in the use of labor. In any given locality it is comparatively easy to find farms that are above the average of their community in one or two of the above factors. But not more than 7 or 8 per cent of the farms of any community are above the local average in all four points. But the truly ambitious farmer will not be content with surpassing his neighbors in one or two or even three of the four factors of success. To receive the highest possible labor income, he must properly balance all these factors, for the well-balanced farm is the most profitable. The weakest factor is the one that needs attention in improving the business. Suppose that a certain farmer gets more than average returns from stock and crops, and he employs both his man and horse labor efficiently, but has a very small farm. His logical means of improvement is to either buy or rent more land, thereby increasing the size of his business. Or take the case of the man who has a large farm and uses his labor efficiently, but his crops and stock yield returns below the average. He should direct his energies towards increasing the fertility of his land and improving the quality of his live stock. The measure of a man's managerial ability

is his success in coordinating and properly balancing these four factors, of size of business, crop yields, returns from live stock, and efficiency in the use of labor.

The importance of properly balancing the farm business is clearly set forth by some recent farm surveys conducted by the United States Department of Agricutlure in a dozen widely separated regions of the country. In Clinton County, Indiana, the business operations of a hundred farms were carefully analyzed and compared with the average of the county. Twenty-seven of these farms were found to be above the average in one of the four essential factors, and their average labor income was $252. Twenty-nine of the farms exceeded the local average in two of the essential factors, and their average labor income was $496. Twenty-two of these Clinton County farms were above the average in three of the four essential factors and yielded a labor income of $943; while out of the entire hundred only nine were above the average in all four factors, and their average labor income was $1,606. Certainly it pays to seek a proper correlation of all four factors rather than to be satisfied with high development along one line only. The data obtained in the other regions considered bear out the same principles as the figures taken in Clinton County.

Farmers everywhere are becoming alive to the fact that business principles pay when applied to farming operations, and they are seeking information regarding methods of analyzing their business and the keeping of farm records. Much valuable information can be obtained by reading Farmers' Bulletin No. 1139, from which the above figures are taken. The title of this bulletin is "A Method of Analyzing the Farm Business," and a postal card to the Secretary of Agriculture, Washington, D. C., will bring it free. Blanks for recording the year's financial transactions are sent with the bulletin, and every farmer interested in raising the efficiency of his farming methods should give the matter serious study.

SOW WHEAT LATE.

For the southern parts of the State it is not too late to drop a word concerning the sowing of wheat. The Purdue Experiment Station estimates that the Hessian fly damaged Indiana's last wheat crop to the extent of nearly six million dollars. This tremendous damage can be greatly reduced by sowing later—as late as the first week of October in southern Indiana. If the late sown wheat has the advantage of a thoroughly prepared seed bed, and a liberal application of fertilizer, it will be just as far ahead when winter sets in as wheat that was sown earlier under less favorable conditions.

Nothing will give more satisfaction and better repay the time and money spent than a choice selection of bulbs planted in the fall.

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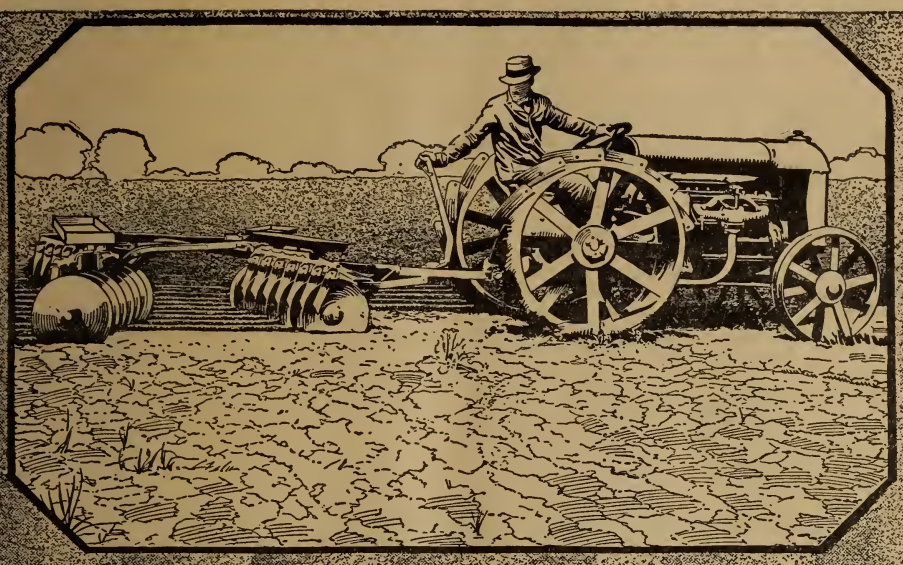

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It provides fast, thorough and deep seedbed preparation. That is why you will want one with your Fordson. Then, too, there are Roderick Lean spike tooth, spring tooth and orchard harrows, specially built to work with the Fordson.

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Alumni and Local

FOOTBALL.

With the fall of 1920 Purdue University seems to be entering on a new era as to athletics and athletic spirit. With the thoughts of the famous "Victory Five" still fresh in the minds of students, athletes and coaches and a squad of one hundred football candidates out for practice everything is at fever heat.

Too much credit can not be given the Athletic Department and Coach Scanlon in keeping athletes in school. Contrary to preceding years, all men who were promising material from 1919 Freshman Varsity are back fighting for a place on the team.

Last year Coach Scanlon turned out from green material one of the best fighting teams in the West, but they were handicapped in that they had not sufficient weight in the line on a dangerous offensive. But in this year's squad there is weight, speed and a fair degree of experience, thanks to previous Varsity experience and spring practice.

Veterans from last year's squad include Captain Burk, "The doughty Kentuckian;" Miller, his running mate, at tackle; Cooley, guard; Stanwood, center; Spencer, Wyckoff and Geyer, guards.

From last year's freshmen squad come Carmen, Gully, Swark, Frazier, Geiger, Keller, Beller, Doug. Fields, Faust, and a half score of other huskies which make a forward wall, averaging around 190 pounds, a certainty. Backing up these men we find Wagner, Neeker, Macklin, Hanna and Foresman of last year's Varsity, and Rate, Watson, Don Fields, Micky Murphy, Andrews, Calhoun, Evans, Reed and Abramson of Freshman fame.

With this formidable line-up, and Coach Scanlon "the maker of fighting teams" at the wheel, Boilermaker fans are looking for a settlement of score with Chicago and Indiana.

Alumni are urged to come to the homecoming game and get acquainted with new conditions at the same old school.

Mr. Clarence E. Baker, a 1920 graduate of Illinois University, has been engaged by the Horticultural Department as Assistant in Pomology. His work while here will be entirely with the Experiment Station.

ALUMNI NOTES.

P. H. Walser, '20, will take a position as instructor in Animal Husbandry at the Texas Agricultural and Mechanical College.

E. G. Sieveking is an instructor in Agricultural Chemistry in the University of Missouri.

J. R. Walters, formerly of the '20 class at Purdue but who graduated from the University of California, will act as instructor in Animal Husbandry at Berkeley, Cal.

G. W. Stuppy, '20 class, has been added to the Bacteriological Department of Purdue University.

F. J. Keilholtz, '20, is now doing special publicity work at the Purdue Extension and Experiment Station.

P. L. Fatout, '20, has accepted a position as instructor of Animal Husbandry at Penn. State.

W. H. Martin, '18, has resigned his position as assistant manager of the Furnas Ice Cream Co. at Danville, Ill., and will teach marketing milk and milk products at Penn State.

J. L. Morrow, '20, and Miss Ruth Noble, of Frankfort, were married June 16, 1920. Mr. Morrow is now operating his farm near Francisco, Ind.

Oct. 2—Depauw at Purdue.
Oct. 9—Chicago at Chicago.
Oct. 16—Ohio State at Columbus.
Oct. 30—Wabash at Purdue.
Nov. 6—Notre Dame at South Bend.
Nov. 13—Northwestern at Evanston.
Nov. 20—Indiana at Purdue.

DEPARTMENT OF FARM MANAGEMENT OPEN.

Prof. O. G. Lloyd has been selected as head of the Farm Management Department. This is a new department here, but is well established in most agricultural colleges.

Professor Lloyd comes from Iowa State College. He received his B. S. degree at Utah Agricultural College in 1910, and spent two years at Wisconsin working on a doctor's degree, and making a special study of farm tenancy, methods of renting farms and farm values.

He is carrying on extensive tractor vs. work-horse power and efficiency tests over the State and will teach Farm Management

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Editor's Note.—The Swartz Electric Co. has contracted for this inside double spread for the full nine issues of the Purdue Agriculturist.

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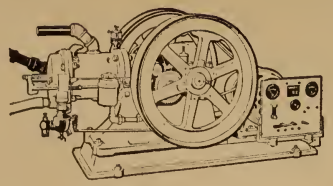

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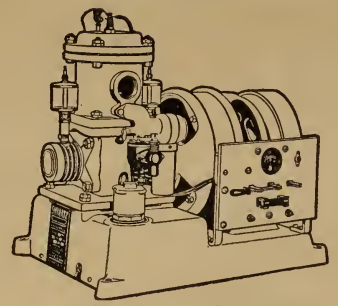

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Canning of Meat

By Alma L. Garvin,
Assistant in H. E. Extension Division.

NO subject has created more interest in the household these past few years than the preservation of foods, and the housewife has proven her spirit of thrift by the quantity of foodstuffs she has canned. The one period cold pack process has made it possible to can successfully all vegetables and fruits as well as meats. During the late fall and winter months our attention is called to the surplus of foods which must be taken care of in order to have them last a longer time and not be wasted.

The principal means used to preserve meats are smoking, drying and curing with salt. These methods take away the flavor of the fresh meat. The only means to help keep the fresh flavor is canning. This process has become quite popular these past few years. The canning of meat is more difficult than the canning of fruits and vegetables, so a novice should not start with meat canning until she has become an experienced canner of fruits and vegetables. In order to have success, great care should be exercised to use fresh meat which is in first class condition, to have good clean jars which have been tested for leakage, good new rubbers, and processed long enough to kill the bacteria. This meat should be sterilized in a good type of sterilizer for a sufficient length of time according to time table.

Any kind of meat, beef, pork, mutton, chicken may be canned successfully. The meat may be put in the jars partially cooked, the length of time of sterilization may be shortened slightly. The meat may be mixed with vegetables and canned as a stew. This gives a good basis for soup or Hungarian Goulash, meat pie, etc.

Some of the advantages in canning meat are:

1. Enables the housewife to prepare an appetizing meal quickly with little exertion.

2. In canning of meat, the surplus of meat after butchering is taken care of and it is not necessary to sell at a sacrifice.

3. When culling the chickens, culls may be canned in the fall for future use, to save the expense of care and feeding.

4. It is possible to have fresh meat at

all times during the year instead of having a surplus at any one time.

The following recipes for canning meat have been taken from Farmers' Bulletin No. 839:

Poultry and Game Birds.

"Kill fowl and draw at once; wash carefully and cool; cut into convenient sections; place in wire basket or cheese cloth and boil until meat can be removed from bones; remove from boiling liquid and remove meat from bones; pack closely into glass jars; fill jars with pot liquid after it has been concentrated one-half; add level teaspoonful of salt per quart of meat for seasoning; put rubbers and caps of jars into position, not tight. Sterilize for the length of time given for the particular type of outfit used:

Water bath, home made or commercial —3 hours. Water seal, 214 degrees—3 hours. 5 pounds steam pressure—2 hours. 10-15 pounds steam pressure—1 hour.

Remove jars; tighten covers; invert to cool and test joints. Wrap jars with paper.

Fresh Beef.

Obtain fresh beef, cut into convenient pieces for handling (about ¾ pound in weight), and roast or boil slowly for one-half hour. Cut into small pieces, remove gristle, bone, and excessive fat, and pack directly into hot glass jars; fill with gravy from the roasting pan or pot liquid concentrated to one-half its volume; put rubber and top into position, not tight. Sterilize for the length of time given below for the particular type of outfit used:

Water bath home made or commercial—3 hours. Water seal, 214 degrees—3 hours. 5 pounds steam pressure—2 hours. 10-15 pounds steam pressure—1 hour.

Spring Chicken, Fried.

After cleaning and preparing spring frys, season and fry as though preparing for serving directly on the table. Cook until the meat is about three-fourths done. If a whole spring chicken, break the neck and both legs and fold around body of chicken. Roll up tight, tie a string around the chicken, and drop this hot, partially fried product into hot quart glass jar. A quart jar will hold two small chickens. Pour liquid from the griddle or frying pan into the container over the chicken. Place rubbers and caps of jars into position, not tight. Sterilize for the length of time given below for the particular type of outfit used:

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Manufactured in accordance with the Indiana Feeding Stuffs Control Law—Guaranteed to contain not less than 60% Protein, 6% Fat. Is recognized as one of the leading brands on the market and a very profitable article when fed at any season throughout the year. A trial will convince you of its merits.

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BEEF AND PORK PACKERS,
INDIANAPOLIS, IND.

Water bath, home made or commercial —90 minutes. Water seal, 214 degrees—60 minutes. 5 pounds steam pressure—40 minutes. 10-15 pounds steam pressure—30 minutes.

In a similar way any fowl or wild game may be prepared by frying, oven baking, roasting or stewing. The meat products which may be canned in this way include beef, pork, Hamburg steak, sausage, venison, rabbit, squirrel, racoon, opossum, lamb, and all types of sea food. All may be packed after cooking three-fourths done in any desired way. Hot glass jars should be used. When the products are packed while hot in the containers, the hot liquids, gravies, dressings, etc., or hot water should be poured over them. Put rubbers and caps of jars into position, not tight. Sterilize for the length of time given below for the particular type of outfit used:

Water bath, home made or commercial —90 minutes. Water seal, 214 degrees—60 minutes. 5 pounds steam pressure—40 minutes. 10-15 pounds steam pressure—30 minutes.

Tighten jars and invert to test joints.

Pork.

Roast Pork—Roast as for table, fill jars with large pieces, and fill about one-half full of roast liquid, partially seal jar and cook 2½ hours in wash boiler.

The brown gravy can be made at the time of filling the jars and poured over meat. Pork brown gravy is more delicious thickened with cornstarch.

Spare Ribs—Saw and cut into suitable pieces; fry or bake until slightly done yet brown; salt and pepper to taste, put in jars, adding a little of the brown liquid; partially seal jar and cook 2½ hours in wash boiler.

Sausage in Hot Fat—Saute or bake sausage until well browned and thoroughly done. Pack into stone or glass jars or tin cans. Cover with hot melted fat, seal.

Sausage—Shape sausage into cakes. Saute or bake until cakes are well browned. Pack carefully and tightly into jars. Add small amount of water to fat, and pour this over the sausage, putting into each can only liquid enough to come one inch from bottom of can.

Rabbit.

Rabbits are delicious when canned. Can the same as chicken.

CHRISTIE NEW DIRECTOR OF EXPERIMENT STATION.

Prof. George Irving Christie, for twelve years superintendent of Purdue Agricultural Extension Department, has been appointed Director of the Experiment Station. In the latter position he succeeds Prof. C. G. Woodbury, who has resigned to become head of the Food Research Department of the National Canners' Association at Washington, D. C.

Professor Christie will also continue in the capacity of superintendent of extension, thus combining the two branches of work under one head.

Professor Christie is a capable man and has the necessary education and experience to capably fill such a position as the two combined departments provide.

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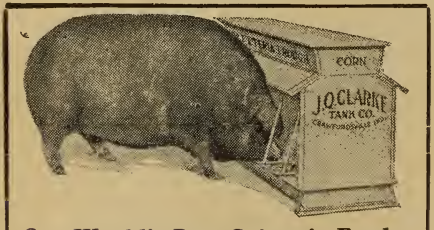

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Agriculture in the High School

By Z. M. Smith,
State Supervisor of Agricultural Education.

A FOUR-YEAR COURSE in vocational agriculture has been organized in sixty-seven high schools in Indiana. The course is established and maintained in each case as a department in a township, town, or city high school. These departments are established in accordance with the provisions of our State Vocational Education Law which was enacted in 1913, and are maintained with local funds supplemented by state and federal funds.

The Smith-Hughes Act, passed by the federal congress in 1917, has not changed the plan and program for vocational agriculture in Indiana which were fully outlined and in operation before the federal law was enacted. Vocational work under the provisions of our state law meets in full the requirements of the federal vocational education act. Our state plans have been approved by the federal board for vocational education, and annually the amount due Indiana through the provisions of the Smith-Hughes Act is paid into our state treasury and is added to our state vocational education fund. The federal funds for vocational agriculture in our state for the year ending June 30, 1920, amounted to $3,551.70. Next year the amount will be approximately $40,000.00. The quota from the federal treasury will be increased annually until the year 1926, at which time the maximum of $94,000.00 will have been reached. To make this sum available to our state next year, at least an equal amount for vocational agriculture must be extended from state and local funds.

No attempt will be mude in this brief discussion to enumerate all the provisions contained in the state and federal vocational education laws in operation in Indiana. Among the important provisions is the one that requires that the courses of instruction be designed and administered for persons over fourteen years of age who are engaged in the occupation of farming or who are preparing to enter upon said occupation. The vocational agriculture teacher can not, therefore, enroll in his classes pupils who do not expect to engage in farming as an occupation. In conformity with a regulation of the state board of education in accordance with the provisions of our state vocational education law, a teacher of vocational agriculture can have but two classes. One class is under his direction and instruction all of every forenoon, and the other all of every afternoon. Each class has two vocational subjects daily with the vocational teacher and two academic subjects with other teachers. One class is composed of freshmen and sophomores, and the other of juniors and seniors. By making this combination of pupils and by alternating the first and second year courses and the third and fourth year courses, one teacher can handle all the vocational subjects in a four year course. The supervised farm practice which is required for approved vocational instruction is exceedingly important. By this method of instruction each pupil carries on throughout the year a definitely outlined and organized project of work in connection with the normal enterprises on the home farm. The project work is demonstrative in character rather than experimental. If any part of the pupil's school time is needed for his home project work, it is taken out of the half day which he has with the vocational teacher.

The demand for vocational departments in agriculture in the high schools of Indiana has grown to the extent that teachers can not be secured in sufficient numbers to meet the demand. Superintendents, principals, teachers, and school officials comprehend more fully now than at any previous time their duty and responsibility in connection with high school courses in vocational agriculture. They realize as never before that the authority to establish and maintain vocational instruction is vested in them by law and that providing such instruction is a very important part of the work which the public employs them to perform.

The demand for vocational instruction in agriculture is not limited to any one part of the state, but comes from all parts of the state. From twenty-five to thirty more new departments could have been established this year than were established, if teachers had been available. The sixty-seven departments now in operation are located at Auburn, Metz, Garrett, Waterloo,

Columbia City, Bremen, Warsaw, Angola, Monticello, Brookston-Chalmers, Delphi, Battle Ground, Dayton, West LaFayette, Stockwell-Clarks Hill, West Point, Romney, Crawfordsville, Lebanon, Veedersburg, Kingman, Mooresville, Indianapolis, Paragon, Bargersville, Gosport, Spencer, Brazil, Clay City, Corey, Worthington, Washington, Loogootee, Owensville, Mt. Vernon, Lake, Seymour, Columbus, Scottsburg, Corydon, DePauw, New Salisbury, Palmyra, Mauckport, Charlestown, Vevay, Aurora, Moores Hill, Manilla, Greensburg, Shelbyville, Morristown, Greenfield, Pendleton, Elwood, Summitville, Matthews, Winchester, Frankfort, West Lebanon, Mt. Summit, Marion, Forest, Rossville, Flora.

Vocational agriculture in the high schools of Indiana has demonstrated its worth in the state educational program. Eminently capable boys of keen intellect and sound judgment are enrolled in the vocational agriculture classes and are manifesting a genuine and intelligent interest in the complex problems of the farm and in the important issues now confronting society. The character of the vocational instruction is such that it makes a strong appeal to progressive, energetic, capable boys and young men. Fundamental principles of science are applied in most practical ways to the livestock, crop production, soil management, marketing, and other problems with which farmers have to deal constantly. As a part of the work of our public schools, vocational agriculture provides for the boy who expects to farm, an educational opportunity equal in every respect to that provided for the boy who desires the kind of training that leads to one of the professions.

The present demand and outlook for vocational training in agriculture, together with the response the schools are giving to the plea of our youth for extending equal educational opportunity to each of them, assures a citizenship that measures up to high ideals of social service free from servitude and that is capable of providing a livelihood without in the least degree detracting from the fullest understanding and the keenest enjoyment of complete living.

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THE POULTRY DEPARTMENT OF PURDUE UNIVERSITY

October 8-9, 1920

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INDIANA STATE POULTRY ASS'N

An educational program of interest to farm poultry raisers, baby chick producers, commercial poultrymen, and all poultry breeders, is being prepared. For program and further particulars write Leroy L. Jones, Sec'y-Treas., Indiana State Poultry Association, Lafayette, Ind.

The Relation of Dairy Products to the Food Situation

By Paul Blackburn, '22.

MILK is the greatest of foods. It is the only indispensable article on the human bill of fare. It is the only one that is made especially to support animal life.

Milk is the greatest source of calcium of all foods. Lime is one of the components of food that serves two purposes: it is both building material for bones and regulating material for the body as a whole. Whatever other foods we have, we cannot afford to leave milk out of the diet because of its lime.

Whole milk contains everything necessary for the growth and maintenance of the human body: protein, fat, milk sugar, salts, water, and more—certain unknown substances, sometimes called vitamines, vitalizers we might call them. On account of their unknown character they are sometimes referred to as "water soluble A" and "fat soluble B," because they find two classes of these substances without which man and other animals die.

Milk enters largely into commerce in the form of its derivatives, butter, buttermilk, cheese, condensed, evaporated, and dehydrated milk. In these concentrated forms it can be kept for months, therefore the high commercial value of the derivatives. Cottage cheese as a source for sup-

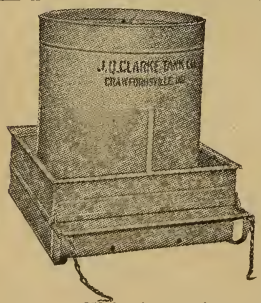
plying protein and energy is cheaper than most meats at the present prices.

The dairy industry is widely scattered because of many forces, agricultural, climatic, commercial, personal, and social. Among these is the fact that its products are for immediate or nearby use, as well as distant and later use. Dairying must be carried on where there is sufficient rainfall to produce the succulent grass and other forage required by cows if they are to give profitable quantities of milk. Often in dry and rough countries, what little milk is supplied, is often obtained from goats. In all Greece there are but four thousand cows, most of them near Athens. Goat's milk is richer than cow's milk. One of the characteristic street scenes in these countries is the milkman driving herds of goats through the street and milking them at the door of the customer's home. Dairymen in these dry countries by the use of such methods are able to guarantee the freshness and purity of the milk. Such dairymen also avoid the difficulties of keeping bottles clean, and the even greater difficulty of cooling milk in a country without the cool springs or ice that are so indispensable to the commercial dairy.

Dairy producing districts are near cities. However, if the supply is not sufficient, as is the case around New York City and Philadelphia, the milk is brought to the city in special express trains. The supply for New York City is obtained by trains running from Wayne County, Pennsylvania, and from banks of the St. Lawrence to New York City. The supply for the city of Philadelphia comes from points as far away as the shores of Lake Erie, Lake Ontario, and the Chesapeake Bay.

Without a doubt, the many improvements made in the manufacture of dairy products, and in handling the milk itself have done wonders toward putting dairy products of a high grade before the public. Instead of the old shallow pan method of skimming, the centrifugal separator takes the fresh milk as it comes from the cow, and by centrifugal force separates the cream into one vessel and the skim-milk into another. The power churn, and the large efficient pasteurizer have aided materially in increasing the output of the many commercial creameries. The Babcock test has brought about more friendly relations between the farmer and the creamerymen. The Creamery License laws providing for the licensing of all creameries, or shipping stations buying cream on the butterfat basis, protects both the farmer and the creamerymen.

Dairying marks an important stage in the intensification of agriculture. There are two ways in which a farmer may increase production. One is to take more land, which often cannot be had; the other, to put more care and labor on the land he has. Where the population is sparse, little land is needed to produce the food, and the farmer can pay interest on its small value by cultivating a small part of it, with a minimum amount of labor, and pasturing the rest. New countries are therefore rarely dairy countries. The Great Plains of the United States are an excellent illustration. There are millions of cows, but not enough butter, milk, and cheese for the use of the people. The cow, with little care from her owner, runs on the great range, and the calf which consumes all her milk may never be seen by the owner until the day the animal is branded or sold. Before the war, dairying was stead-



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High Grade Furnishings

FARMING IN PALESTINE

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PALESTINE—the Holy Land—birthplace of Christianity and cradle of the highest type of civilization! One of the richest of agricultural countries, her land, because of limestone composition, is practically self-sustaining, and crops are raised year after year without fertilization. What an opportunity has been hers to take the lead in modern progress.

Compare the present day scene pictured above with the American farm, farmer, and farming equipment, and how vivid the realization that Palestine has in no way measured up to the agricultural opportunity which was hers by right of years, distinction and natural resources. In all this time hardly any advancement has been made in agricultural methods.

True, they have not the open way to agricultural progress which is easily accessible to the American farmer—agricultural papers and schools are there almost unknown—but they fail even to avail themselves of the meager opportunities of this nature which may be afforded them. As the result of this lack of information and indifference concerning it, we find present agricultural conditions as illustrated—the same as 3,000 years or more in the past.

The direct opposite of this is the aggressive, modern farmer of the Western Continent. With him today, farming is recognized as a science and a business, and as such he studies it. Not because of necessity, but due to his ambition and pride in achievement, he makes use of every available means of improving his own condition, that of his friends and neighbors, and of his state and nation as well.

Farm publications have performed an enviable part, especially during late years, in furthering this progress and improving farm conditions. Editorially and otherwise, they oppose that which is detrimental to farming interests. Their influence is with every movement designed to make farming more pleasureable and profitable. Through them the farmer is given in detailed specialized information he otherwise would fail to receive. They serve as his buying guide; he knows that no unworthy advertiser has access to their pages. By them is created a desire on the part of present generations to continue, and improve upon, the work done in generations past. The forward looking farmer recognizes farm papers as his strongest ally.

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ily increasing in the northern section of the corn-belt, though both Iowa and Illinois show a recent decline in comparison to beef cattle, almost certainly temporary and due to the enormous prices being paid for meat. The dairy industry has been steadily gaining over the meat industry in this section on account of the high value of land.

Countries, other than the United States, engaged in dairying are Canada, the European countries, the Argentine Republic, and Australia. Northwestern Europe, with its fertile soil, cool climate, pasture, summer rains, and dense population, has every requirement of a great dairy region, and the scarcity of meat causes cheese to be used far more than in meat-eating America. The European demand for cheese and butter is so great that Canada and other parts of the world supplement the enormous home production. Dairying in the other countries mentioned is not so highly developed. However, Canada has recently sent investigators to England to study their methods, and intends to establish more dairy schools in Canada, and push the dairy business to the limit.

With the ever increasing number of labor saving devices, the building of gigantic storage houses, the perfecting of the refrigerator car, the converting of the raw milk into less perishable forms, the national campaign for the use of dairy products, the use of all the by-products of the factories, the dairy industry has been placed on a sound basis, and the use of dairy products will be forever reaching out into new territory, because of their increased favor among the people.

When we have come to realize the food value of dairy products, and have given them a large part in our diet, then we will have made considerable progress towards the solution of the food situation.

Mr. T. J. Barnes is the new foreman of the Purdue orchard. Mr. Barnes comes from Mt. Healthy, Ohio, and has had a lifetime experience in the nursery and orchard business.

The number of bulbs adapted to fall planting is very large and some of the common ones are known to every one. Tulips, narcissi, hyacinths and the various lilies (genus Lilium) are all well known and easy to grow.

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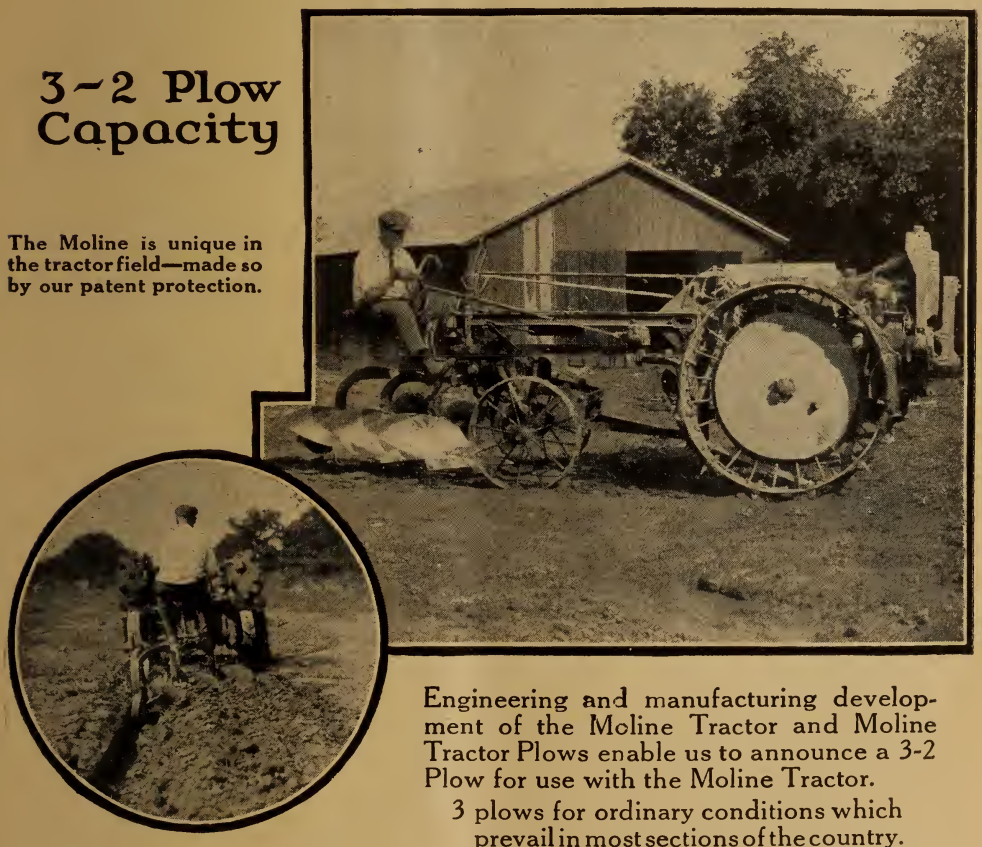
The Moline is unique in the tractor field—made so by our patent protection.



If desired you can use the "drag behind" or horse drawn implements you now have with the Moline Tractor the same as with other types of tractors.

Engineering and manufacturing development of the Moline Tractor and Moline Tractor Plows enable us to announce a 3-2 Plow for use with the Moline Tractor.

3 plows for ordinary conditions which prevail in most sections of the country.

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An average saving of 4.7 horses per farm, and a total average saving of $1447.58 per year, is reported by yearly Moline tractor performance records received from owners to date. We will be glad to give anyone interested the opportunity to personally inspect these records.

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MOLINE PLOW COMPANY, MOLINE, ILLINOIS

The School Lunch

By Laura J. Cheney,
Department of Home Economics.

THE lunch problem of the rural school is one that is worthy of consideration. Proper nourishment for our boys and girls in school who are unable to go to their homes for a warm noon meal, is becoming a matter of general concern. It is not essentially a relief problem, but one of education. Mothers, teachers and educators are coming to realize that, considering the problem merely from the economic viewpoint, it is wise to provide food for physical development of the poorly nourished child, and then consider his mental development, for improper physical development affects materially the mental growth of the child.

Much of the so-called backwardness and apparent stupidity of children is due to improper nourishment. The active, growing child requires more food in proportion to his size than does either his father or mother. Many children from our best homes are hindered in growth by the wrong kind and amount of food given to them.

Proper food means a better physical development, a greater resistance to disease and a marked alertness. The child must be supplied with an abundance of easily digested, properly prepared foods at all times if he is to attain his physical development. The growing child must meet the day's expenditure of energy by a sufficient quantity of food and also enough extra food to make the necessary growth of bone, muscle, nerve and other tissues. Insufficiently fed, the child does not attain proper growth and certain tissues are not properly nourished and the result is frequently deformity from weak bones, or flabby muscles and lack of an abundance of good red blood.

Because children are building nerves, muscles, and bone it is essential that they have a greater proportion of fat, protein, mineral matter and vitamines in their diet than is required in the diet prepared for adults. The child of school age should continue the use of milk in almost as great amounts as when younger, since milk supplies the essential constituents in a form easily digested and assimilated. Eggs and small amounts of meat are necessary to the child's diet also.

The child of school age should be encouraged to eat a good breakfast of nourishing food, such as fruit, well-cooked eggs, toast and either cocoa made with milk or milk alone. He should also be encouraged to rise early enough to eat breakfast in a leisurely manner without haste or anxiety as to danger of tardiness. The bolting of food, and the hurry, plus the mental attitude, are more injurious to the child than the earlier rising would be.

In preparing the school luncheon there are certain things which must be considered. There must be a sufficient quantity of the right food constituents and a variety from day to day to prevent monotony, which will cause the appetite to lag.

A part of this meal must necessarily be cold; hence great care should be exercised to make it most appetizing. In selecting the food for the luncheon one should bear in mind that sandwiches, a succulent food, a dessert, or dainties should always be used.

Sandwiches are easily carried in a luncheon and are generally liked. From the great variety of breads, meats, cheese, nuts, dried fruits, innumerable kinds of sandwiches may be made. There are the white, brown, graham, raisin, nut, and date breads. There are equally as many kinds of fillings, such as chopped eggs, meats, nuts, shredded lettuce, nut pastes, dried fruit pastes, chopped dates, raisins, figs, etc. In making sandwiches do not use bread less than twenty-four hours old, butter it lightly and then add the filling desired. With skill and thought many small amounts of left-over food may also be made into very attractive

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Section of Natco wall showing still air spaces

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are a permanent *investment* — not an expense. They need no painting and very seldom require repairs. They withstand severest windstorms and are fire-safe, being constructed of burnt clay tile. Natco walls are exceedingly strong. Masons lay up these walls very rapidly, easily handling the large-size units.

Whatever you intend to build, build it with Natco Hollow Tile. Many uses are pictured and explained in our book, "Natco on the Farm." Write for it today — *free.*

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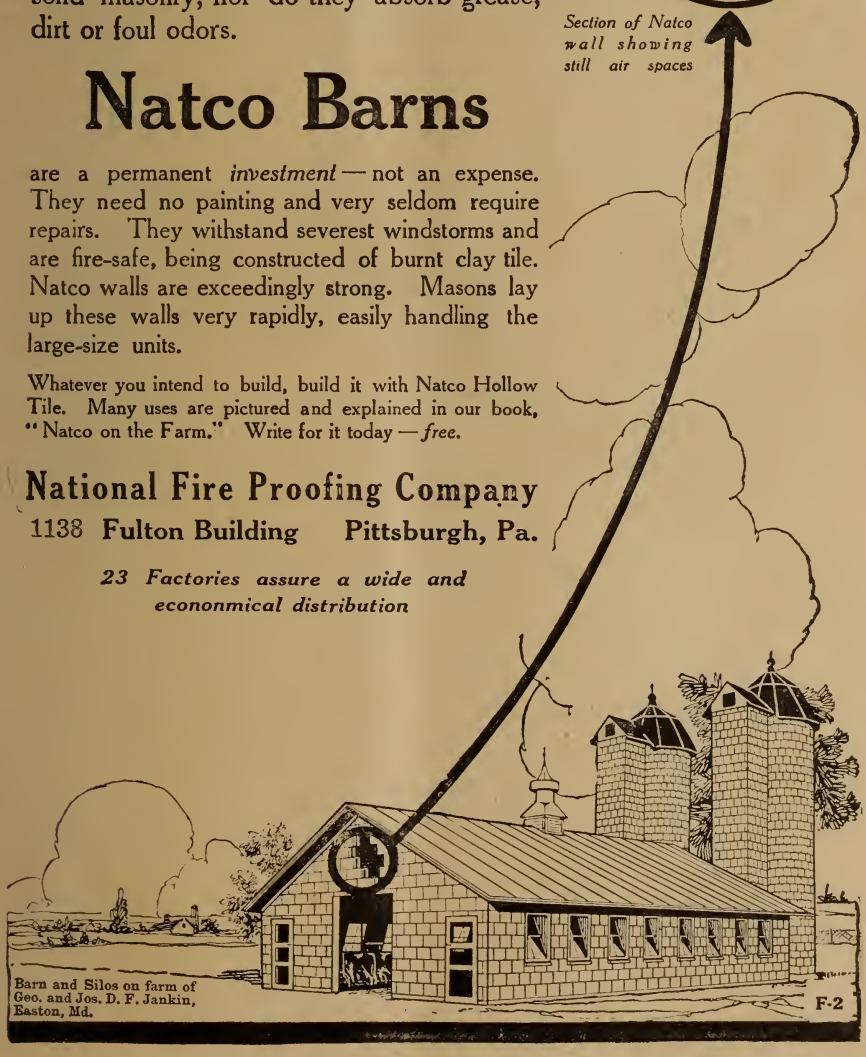

Barn and Silos on farm of Geo. and Jos. D. F. Jankin, Easton, Md.

F-2

sandwich fillings. Plenty of waxed paper should be used to wrap the food of the luncheon, to prevent the foods from flavoring each other. It also adds greatly to the attractiveness as well as to its palatability. As often as possible surprises should be included in the luncheon, generally in the form of a dessert, something the child likes very much. A pleasant surprise adds to the child's pleasure in eating and indirectly aids digestion.

Another main consideration is the "putting up" of the luncheon and method of packing. It must be packed in a small compass and kept for several hours before eaten, and frequently carried over a dusty road by a happy-go-lucky boy. Besides the wrapped sandwiches as previously mentioned, the cup or container with a tight lid should be used every day, permitting of variety in form of some moist food, as baked beans, cottage cheese, fresh fruit, canned fruit, jelly or jam. The milk may be carried in a small glass jar if a thermos bottle is not available. The box itself should be of material without odor, light to handle, admitting of some means of ventilation. The box will need to be cleaned frequently and dried in the air.

The rural school teacher, if wise and farseeing, soon realizes that some hot soup or cocoa will add materially to the nourishment, efficiency, and happiness of the children under her care; and many who have tried the experiment testify that the pupils make better progress in their studies and are also healthier. In many cities and industrial centers the hot lunch has long since passed the experimental stage and is regarded not only as essential to health, but as necessary to the training of the child as well.

Children in the country tend more to be below normal development physically than children in the city. It is not because country life does not offer excellent opportunity for good development, but because so many country people fail to realize the great need of fresh air and wholesome food which is theirs to command.

Whether the cause be poverty, ignorance or carelessness, the child is the one who suffers. The teacher who aids in securing an adequate diet for the child's lunch, greatly benefits the child and also exerts a great influence upon the home and parents, because the child carries the reports of the concrete lesson in the science, of the proper selection and preparation of the food to the home. Thus we see, as Lillian Wald says: "The school lunch is not a departure from the principle of the obligation assumed by educational authorities toward the child, but an intensive application of the measures adopted for the physical nurture of the child, to the end of securing in adult years the highest efficiency of the citizen."

Bulletins may be procured from the Department of Agricultural Extension at Purdue University concerning school lunches if further information is desired on the subject.

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SUMMER MEETING AT LAUREL.

The summer meeting of the Indiana Horticultural Society was held at Laurel, Ind., on August 5. During the forenoon the members of the society took an inspection trip over the two hundred acres of apple orchard of the Laurel Orchard Company. Especial attention was paid to the experimental plots which are under the supervision of Purdue University.

During the afternoon the fruit growers had an opportunity to hear some of the foremost authorities on horticulture. Prof. Joseph Oskamp of Missouri Fruit Experiment Station, Mountain Grove, Mo.; Prof. W. H. Alderman of the University of Minnesota, and Prof. E. J. Kraus of the University of Wisconsin, each gave a most interesting talk. Professor Oskamp was formerly with Purdue University, and while here had charge of the work at Laurel and so was able to give in detail the work being carried on there and the results attained.

Several hundred persons attended the meeting and went away with a broader vision of the possibilities of Indiana horticulture.

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Today progressive farmers everywhere are downing old man High Cost of Farming by employing time-and-labor economy short-cuts wherever possible.

The very important job of hauling, for instance, instead of being side-tracked until some time when farm work isn't pressing, is disposed of quickly and economically with the help of *International Motor Trucks.*

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The fact that *International Motor Trucks* are the product of a concern that has a broad-as-agriculture reputation for fair dealing, good value, and producing dependable farm equipment, should be ample assurance that these trucks will in all cases fulfill their missions of low-cost service.

The sizes range from ¾-ton to 3½-tons capacities and there is a style of body for every hauling requirement.

INTERNATIONAL HARVESTER COMPANY
OF AMERICA INC.
CHICAGO U S A

92 Branch Houses in the United States

MAINTAINING THE LAYING FLOCK.

(Continued from page 8)

sical defects. These birds will come back into laying in January and having had a period of rest will produce eggs of good hatchability which will result in strong and vigorous chicks.

The number of medium producers to be kept will depend on the size of the flock and on the number of vigorous pullets available.

In order to maintain the flock and secure a large yield of winter eggs, at least half of the flock to be retained should consist of strong, vigorous, early hatched, and properly reared pullets. These pullets will begin laying in October and will furnish the winter eggs. Also they and the old birds will lay during the spring and summer and in the fall the best birds from the entire flock can be selected for breeders the following spring and more pullets added to take the place of the poor producers.

A flock made up of from 40 to 50 per cent of hens carefully culled, the best to be used for breeders, and 50 to 60 per cent of pullets, for winter egg production, under proper conditions of feeding and management, should result not only in a great improvement in the flock as a whole, but should also return a good profit.

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ATHLETIC
GOODS
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HORTICULTURAL EXHIBIT AT THE STATE FAIR.

Visitors to the State Fair this year were given an opportunity to see a beautiful display of Indiana grown fruits. The exhibit was much larger than that of last year, when unfavorable spring weather cut down production. The crop of all fruits is generally good over the state this year and the results obtained by growers in producing good fruit found expression in the many exhibits at the fair.

The display of fruits was the main attraction in Art Hall. The apple was most conspicuous in number of plates and trays. Early and late varieties, attractive in color and size, were on display. In addition to the apple, plums, peaches, pears, quinces, grapes, pawpaws, and nuts were among the prize winning fruits.

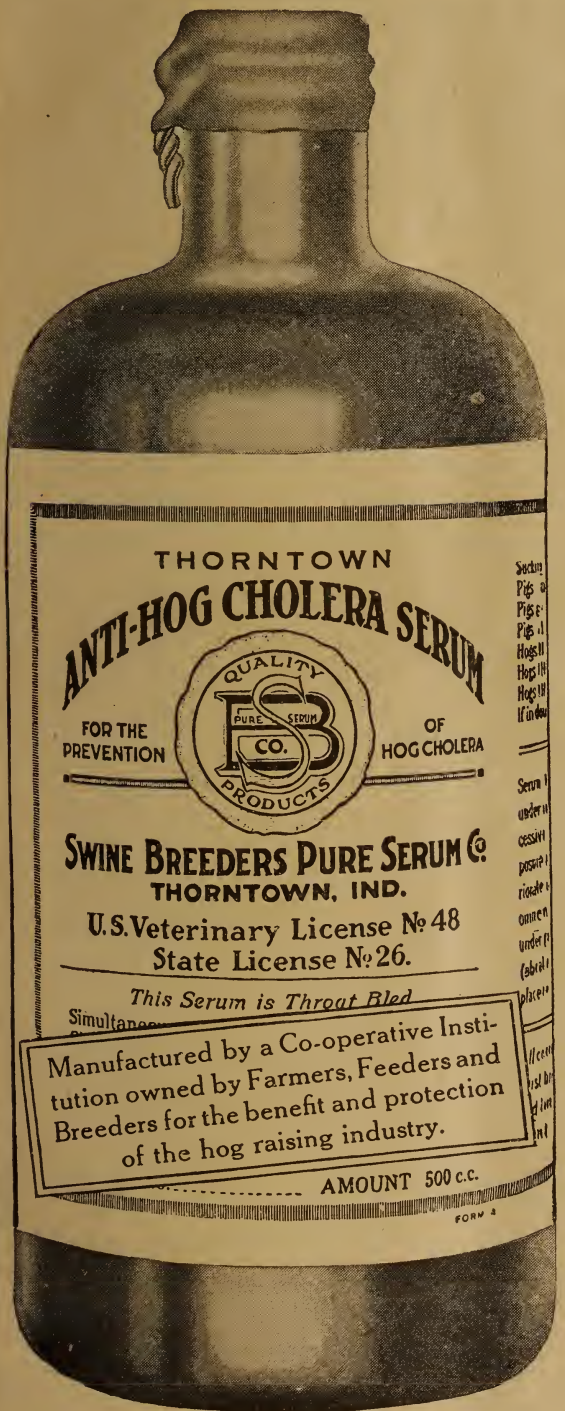
LARGE ENROLLMENT IN UNIVERSITY.

"Enrollment in the University up to date has been so heavy that it was found necessary to issue a statement by which registration will be closed tomorrow," thus said the Purdue Exponent on the morning of September 10.

Living conditions on the West Side are such that no more can be accommodated. The University is beyond efficient limits and the great increase of all costs leaves no margin in its resources which would enable it to provide either teachers, rooms or equipment for any further increase in the student body.

Surely the time is ripe for a "Greater Purdue" in a real sense as to equipment and teaching staff. We must either expand or lose our well earned prestige among educational institutions of the country.

Speaking of sowing wheat, have you given the Hot Water Treatment a trial yet? If you believed it would increase your next year's crop five bushels per acre, would you try it? Its use has done that much for other Indiana farmers, so why not for you? Experiments have conclusively demonstrated the reliability of this process for destroying stinking smut, and loose smut, and lessening the effect of wheat scab. Get detailed information from your county agent, or write to the Experiment Station for bulletins.



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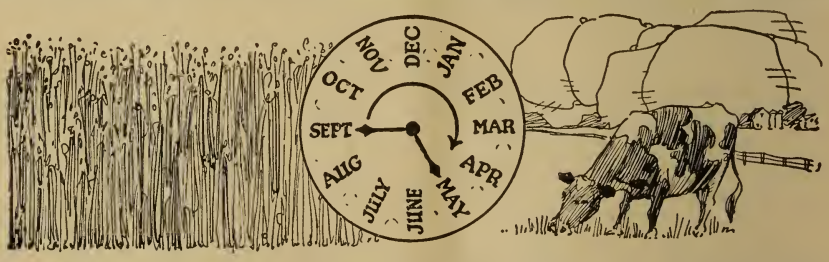
MEET PROF. H. W. GREGORY,
New Chief of Dairy Husbandry at Purdue.
By Prof. P. S. Lucas.

Agricultural students returning to the University this fall, and more especially those taking dairy work, will feel gratified to hear of the appointment of Prof. H. W. Gregory to fill the vacancy of Chief of the Dairy Department. Prof. O. E. Reed, who has been in charge the past two years, resigned last August 1st to become manager of the Gossard Breeding Estates at Martinsville, Ind.

Professor Gregory has been connected with Purdue for the past four years as Associate Professor of Dairy Manufactures and Superintendent of the Purdue Creamery, and is therefore thoroughly conversant with the University policies and ideals. He holds the Master of Science in Agriculture degree from this school. His undergraduate work was taken at the Oklahoma Agricultural and Mechanical College, from which he was graduated in 1912. After graduation he spent four years as instructor and experiment station worker in dairy manufactures at the South Dakota Agricultural College, and came here from that school. While Professor Gregory's work since graduation has been chiefly along dairy manufacturing lines, he was reared on a dairy farm which, with his work in manufactures, has brought him into such intimate contact with farm dairymen that he understands and appreciates the problems confronting the milk producer as well as those of the dairy manufacturer. Purdue is to be congratulated on being able to secure a chief of Professor Gregory's training, experience, and ability to carry on the great work begun by Prof. O. E. Reed.

BANK STARTS COW CLUB FOR GROWN-UP PATRONS.

The First National and State Banks, both at Veedersburg, have started a cow club among grown-up patrons of the bank. Representatives of the bank with the county agent and dairy specialists recently purchased the animals which have been put out in the community to encourage the dairy industry. All the animals are pure-breds and many of them will be used as foundations for new herds. The same banks are supporting considerable boys' and girls' club work.



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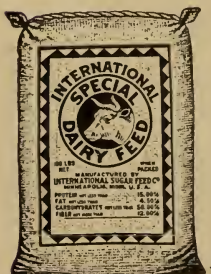

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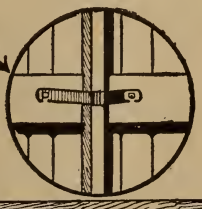

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NOV 11 1920

The PURDUE AGRICULTURIST

NOVEMBER, 1920

Vol. 15 No. 2

How to Feed for an Egg Harvest Now

Grain feeds alone are not sufficient because they don't contain enough protein to make a white to go with each yolk developed. As yolks can't be laid without whites, a large number of them are not laid at all, but are absorbed back into the hen's system as fat, when she is fed grain only. Corn, kafir, wheat and barley in equal parts contain material for 239 yolks and only 147 whites to the 100 lbs. of feed. Contrast that with Purina Chows:

	Yolks	*Whites*
50 lbs. of Purina Hen Chow contain	*123*	*71*
50 lbs. of Purina Chicken Chowder contain	*91*	*141*
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This perfect balance shows clearly why the Purina Mills are able to guarantee

More Eggs or Money Back

"If hens fail to lay more eggs when fed Purina Chicken Chowder and Purina Hen Chow as directed, than when fed any other ration, the money paid for both these chows will be refunded." You can't lose, when you use Purina Chows. See your dealer or write us

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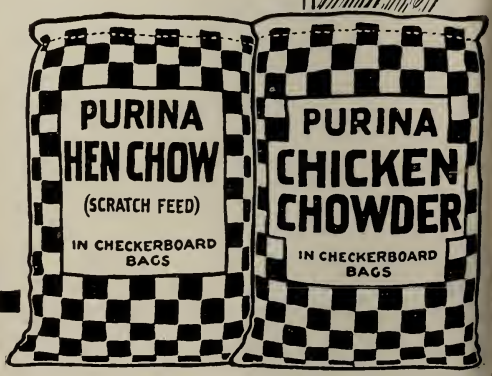
Ask For Free Purina Book

One hundred pages of the most advanced ideas used by successful poultry raisers. Contains plans for homemade buildings and equipment. Shows how to pick the layers without the use of trap nests. Contains practical feeding charts, egg record blanks and scores of helpful suggestions.



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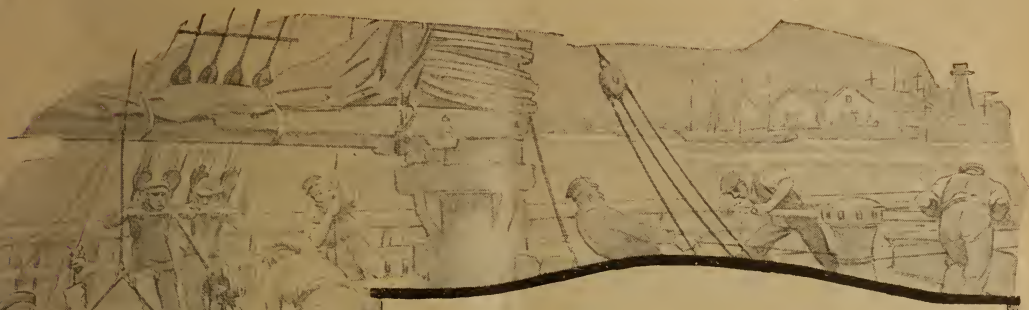

Life on the Ocean with Electricity at the Helm

IN the old days, life before the mast was rated in terms of man power but the new sea is measured in horse-power, with electricity as the controlling force.

A modern electric ship, like the "New Mexico" or the "California," is a great city afloat. With oil or fuel, a central power plant generates sufficient energy to propel the massive vessel and to furnish light and power for every need.

And on the shore the application of electricity to the loading, unloading and repair work saves time and labor.

To make possible marine electrification the future needs aboard ship had to be visualized and then the machinery engineered to meet those needs. In this capacity the organization, experience and facilities of the General Electric Company have been serving the American Navy and Merchant Marine.

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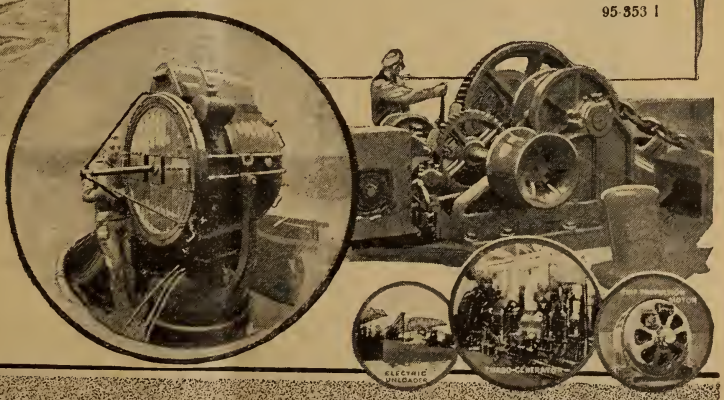

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What We Found Out

Health Conditions a Big Factor

The Quaker Oats Co.

Gentlemen—I must say to you frankly that in my letter to you concerning feeding of Holstein Friesian Cows on my Arden Farms, I overlooked the most important factor, which I wished to bring out. I do not believe in a high protein ration. After the experience I have had, it is my judgment that breeders do not place enough importance upon the maintenance part of the ration of a cow. To secure a maximum yearly production means that a cow must be kept in good physical condition, nothing must be done to tear down the structure. It is my judgment that too much protein is injurious. There is good chance for argument as to just how much protein a cow should have, but I do not wish to engage in a discussion of the fine points, but I believe that a small amount of protein is better than too much, if one expects to have cows go on year after year and maintain their good health and produce their maximum of butter and milk. We mix most of our feed ourselves with the exception of SCHUMACHER FEED and BIG "Q" DAIRY RATION, with which we have been very successful.

Yours very sincerely,

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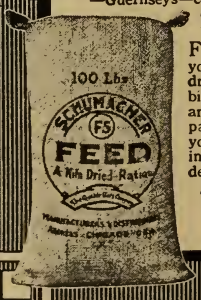

Fed in combination they make an ideal ration—one which you can readily regulate as to amount of protein and carbohydrate content to suit the needs of each individual cow. Their palatability, high digestibility, variety and bulk, induce cows to eat *heartily* and produce *heavily*. With SCHUMACHER FEED as the maintenance part and BIG "Q" as the protein part, you have a ration that will give you maximum long time milk production and ideal health conditions in your herd. A few weeks trial will convince you. Order from your dealer. If he can't supply you, be sure to write us.

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Entered as second class mail matter December 4, 1906, at the Post Office, LaFayette, Ind., under the Act of Congress of March 3, 1879.

Subscription Price, Fifty Cents Per Year. **Advertising rates sent on application.**

There is always room for one more.

The Purdue Agriculturist

VOLUME XV NOVEMBER, 1920 NUMBER 2

Purdue is Put on Dairy Map

By Prof. L. H. Fairchild.

THE Purdue team took fourth place in the Students' Dairy Cattle Judging Contest held at the National Dairy Show in Chicago—Saturday, October 9th. The competition in this contest was the keenest that has ever been in a similar contest, as there were twenty-one teams from as many states entered. D. C. Badger, Senior in Dairy Husbandry, took second place in individual judging of all breeds and was but very few points below first place. J. F. Beldon was fourth high individual in judging Guernseys, and D. C. Badger was fifth high individual in the Holstein judging. The Purdue team ranked second in the judging of Guernseys. The contest was won by Kansas, Iowa ranking second, and Kentucky third.

The fourteenth national dairy show has gone into history and of it—as is usually said of each of the others—can be truthfully said, that in many respects it was the best one that has ever been held. The show which was held last year for only a week seemed to be inadequate to take care of all the exhibits, meetings, conventions and displays, and this year the time of the show was lengthened to ten days and was held during the days from the 7th to the 16th of October.

From the standpoint of agricultural college students, one of the very most important features of the National Dairy Show is the Students' Dairy Cattle Judging Contest, which is held under the supervision of the Dairy Division of the Department of Agriculture. This contest has always attracted a great deal of interest and attention, but for the last few years the interest in it has seemed to have grown very rapidly. The contest this year was the largest students' judging contest that has ever been held, and the interest taken in it is manifested by the fact that twenty-one teams were entered from such widely separated sections as South Carolina, New Hampshire, Minnesota, Tennessee, Kansas, and Washington.

On Purdue's team were D. C. Badger, J. F. Beldon, J. W. Hayward and W. E. Walters. These men have put in lots of hard work to win the above rating. Training started last spring, at which time several trips were made to visit herds owned by Indiana breeders. The team was chosen early this fall, since which time these men have worked every day in preparation for this contest.

The dairy cattle in the University herd have furnished the foundation for the work of the team, but a number of other herds in Indiana have helped in their training. During the week prior to the contest the team made a trip up into Wisconsin, where a number of the largest and best herds in the country were visited. It is quite a compliment to the quality of cattle of that state that teams from a number of the surrounding states visit these Wisconsin herds prior to the dairy show. An interesting thing in connection with the judging of the Purdue team was its standing in judging Guernseys. Purdue ranked second of all teams entered in Guernsey judging. There are very few Guernseys in the Purdue herd and not many herds in the state, so the team has had little opportunity to see Guernsey cattle prior to its trip into Wisconsin. On that trip a large number of classes of Guernseys were judged and it would seem that that training proved to be very beneficial in giving the men on the team an idea of Guernsey type.

The students' contest was conducted in a very satisfactory way this year. In their preparatory work students are trained to judge cattle closely approaching the ideal type, and this year they were not disappointed in the animals that were chosen for the students' classes. In a Jersey class they had a heifer that had been grand champion

female at the Waterloo Dairy Cattle Congress, in another a junior champion Guernsey at the Wisconsin State Fair and in a Holstein class, the bull that was grand champion at the National Dairy Show in 1918, and another that was second at the same show in 1919. So the students were given an opportunity to show their judgment of some of the very best dairy cattle in the country.

This is the second year a Purdue team has taken part in this contest and the team this year has given a splendid account of itself. Special praise should be given C. D. Badger for his exceptionally good work, but too much credit can not be given all the members of the team for putting Purdue in fourth place in such a contest, as placing within the first five in such sharp competition is a highly coveted honor.

The Housing of Poultry

By H. H. Kauffman, '22.

THE housing of the farm poultry flock, before the cold winter weather sets in, is an important and economical problem. One cold, blustering night with snow and sleet will be injurious and apt to set the laying hens back a month or even more. The old hens should be housed to keep those laying that have continued to produce eggs throughout the fall. It is more important, however, to get the pullets in their winter quarters before they start to lay. The excitement of catching and chasing, the sudden change, added to their natural nervous disposition, is likely to cause them to molt and consequently delay them from laying. Also if they are left to shift for themselves until there is a heavy freeze, and after they have started to lay, the results are far more detrimental. With the price of eggs reaching its maximum in the fall, it is an easy matter to turn the usual tendency of a loss to a profit.

In the spring and early summer there is a natural tendency for the birds to desert their winter quarters and seek a cooler and more desirable roosting place. The nearest tree usually seems to be the ideal spot. It is not only the natural instinct, but oftentimes the hen house and conditions of the house that cause them to change. Dark, uncleaned, and poorly ventilated houses, infested by mites and other pests, are sure to drive birds from their quarters. Likewise in the fall of the year they are more easily trained to return to the house if it is clean and free from pests.

This house for happy, contented hens.

The house itself should be constructed with the following principles in view: (1) economy; (2) convenience; (3) light; (4) freedom from moisture; (5) abundance of ventilation; (6) plenty of room; (7) protection against excessive heat or cold; (8) proof against rats and mice; (9) sanitation.

It is not always necessary to purchase

all new lumber for the house. Oftentimes old farm buildings or second-hand lumber can be used to good advantage. Good lumber is necessary for the sills and frame to insure rigidity. The better grades of lumber are not needed for roofing and the side walls. Second-hand boards covered over with a good grade of roofing material is quite substantial. The house should be planned and built as plain as possible; fancy trimmings and fixtures are usually more detrimental then beneficial.

In planning the house one should give thought to practical labor-saving devices; such as means for easy cleaning, large dry mash hoppers, convenient feed boxes, etc. The convenience of cleaning, and changing of litter should by no means be overlooked.

Light serves two purposes. First, it serves as a germ destroyer; second, it helps to make the surroundings more congenial, thus acting as a tonic for the birds, encouraging them to exercise more freely and consume more food—two essentials for a good egg production.

A damp house is apt to cause sick fowls and encourage the growth of bacteria. Moisture in poultry houses always has been considered a serious problem. But recent experiments have proved that good ventilation is the best solution of this problem.

Ventilation is essential to furnish fresh air, drive away the moisture and serve as a general disinfectant and health preserver. Good ventilation can be obtained by placing six-inch, galvanized pipes nearly touching the floor and extending through the roof. But a more practical method is to use the open front type of house, the openings of which can be covered with muslin during the winter months. The muslin can be tacked on sliding or hinged frames and can be placed over the openings during the cold weather, thus serving to keep out the cold and at the same time supplying plenty of fresh air.

Birds will stand considerable cold if they are not in a draft, and the house is dry. In fact, birds do better in cold, quiet air, than in warmer, drafty air. Extreme heat in the summer is sure to decrease the egg production. It can be partly overcome by the presence of shade, and by allowing a free circulation of air through the houses.

Plenty of room for exercise is required for all breeds—about four square feet of floor space to each bird. Exercise can be encouraged by feeding the grain ration in a deep litter.

Rats and mice can be combated by building good concrete floors. Rats play havoc with chicks and pullets, and are very fond of eggs. Both rats and mice are attracted to the poultry yard by the presence of mash and grain in the hoppers and litter.

Plainness in construction of the house is the keynote of sanitation. Extra equipment oftentimes affords harboring places for bacteria, and mites. All internal fixtures should be movable so they can be thoroughly cleaned and disinfected at frequent intervals.

The Essay Contest

The accompanying article on "Securing Disease-Free Seed Corn," by Earl Elliott, a student in the vocational department of the Shelbyville High School, was awarded first place in the Purdue Agriculturist's first annual essay contest for vocational students of agriculture in Indiana. Second prize was won by Ralph Montgomery, of Scottsburg. His essay on "What the Farmers' Federation Should Mean to the Farmer," will appear in the December issue of the Agriculturist. These, while being judged first and second best, are representative of the kind of essays received.

In conducting the second annual essay contest, our aim is to profit by the experience gained from the first and make the contest of the greatest possible value to the vocational students of agriculture. To this end the contest will be made departmental and a larger number of prizes given. The division into departments will be as follows:

1. Animal Husbandry: Essays pertaining to the feeding, care, and management, etc., of all live stock except dairy animals.

2. Dairy: Essays dealing with dairy production or dairy management.

3. Poultry: Essays pertaining to the poultry business.

4. Agronomy: In this department essays treating of soils, crops, and farm mechanics will be considered.

5. Horticulture and Entomology: Essays dealing with fruits and vegetable production and insects.

6. General and Farm Management: Essays dealing with subjects of a general nature not included under any of the foregoing heads, as farm organizations, rural social life, etc., and essays on farm management.

First, second, and third prizes will be given in each department. This will not only increase the opportunity for winning a prize, but will also make possible a more accurate rating of the essays and the awarding of prizes more appropriate to the subject treated.

The local contests will be conducted in similar manner to those of last year, except that each school will submit the best essay in each department, making possible six (6) essays from each school. These essays will then compete in the state contest. In order to encourage enrollment in the local contest, some uniform prize will be given to each vocational department submitting a report of 100 per cent enrollment in the local contest before February 15, 1921.

Some criticism of the first contest has been heard on the grounds that some of the essays were not entirely the product of the student's own individual efforts. The submitting of such an essay is not only a violation of the rules of the contest, but is not fair either to the student receiving aid or to the other contestants. Assistance given by vocational teachers and others must be limited to the citation and securing of reference material.

We want original essays on whatever the student is most interested in about the farm. Tell us how you have succeeded in handling some farm problem in a unique way or what phase of farming appeals most to you; how you have found and stopped the leaks in farm profits and put the farm on a better paying basis—write about any thing related to farming that you know most about.

Complete rules governing the contest and a catalogue of prizes will be sent to each vocational teacher and announced in a later issue of the Agriculturist.

Securing Disease-Free Seed Corn by the Improved Rag Doll Method

By Earl Elliott

First prize article in the Prize Essay Contest conducted by the Agriculturist last year.—Editor.

IN recent years farmers, corn growers, and agriculturists have been paying more and more attention to the field conditions of the corn crop. Some of the things that have become objects of study are weak stalks, barren stalks, down stalks, irregular stands and early "firing." A great many of these men attribute these conditions to the weather, insects, poor soil and poor seed corn.

Through the work of Mr. G. N. Hoffer of Purdue Experiment Station, and by means of test plots in Shelby County, Indiana, the fact was established that a relationship exists between these field conditions and certain molds as detected on the germinator. Mr. B. H. Duddleston and Mr. J. F. Trost worked with Mr. Hoffer as scientific assistants in securing data on this work.

In keeping with this line of work the vocational agricultural class of Shelbyville High School made trips to the respective homes of the members of the class and selected seed corn from the fields before husking time. This was in the autumn of 1919 and under the direction of E. L. Austin, the vocational agricultural teacher, the boys gathered several bushels of good seed corn. The school laboratory of the class was arranged with a number of racks for holding seed corn and as soon as possible all the boys brought in their seed corn and placed it on the racks where it remained all winter.

A plan was then worked out whereby corn could be tested on a large scale. The Shelby County Farmers' Association furnished nearly all the equipment and it was through their co-operation that the services of Mr. Hoffer and his assistants were secured for the work at the high school. Ac-

cording to this plan, each member of the association could bring one hundred and fifty ears of corn to the school for the disease test. This amount was necessarily limited because of the labor and time required to do the work. The limit was placed at 10,000 ears besides the corn belonging to members of the class, and immediately farmers from all parts of the country took advantage of the opportunity. In fact, many more asked to have work done than could be accommodated.

In preparing to take care of the corn to be tested, some special racks had to be made. Plastering lath was used as laterals and boards six inches wide by seven feet long were used as uprights with laterals far enough apart to let an ear slip between them easily. Every rack was numbered. It was found that a lath was long enough to accommodate twenty ears, which was the number to be tested in each doll.

The cloth for the dolls was unbleached muslin, shrunk, so that no allowance would have to be made later for shrinkage. Then the cloth was cut into strips twelve by fifty-four inches, which size is large enough to hold twenty rows of grains, laid crosswise, with two inches between the rows and a two or three-inch margin at each end of the cloth. In preparing the doll, clean newspapers were spread on the table to prevent any disease reaching the corn on the cloth. On these was spread a strip of heavy butcher's paper, twelve inches wide and sixty inches long. The cloths are boiled three hours each time before using in order to sterilize them thoroughly. The process of filling the dolls is about as follows: The first ear is taken off the rack and, beginning at the butt and working towards the tip, eight grains are taken out and laid in a row, in consecutive order across the cloth with the germ side down and tips of grains all pointing in one direction. When all twenty ears have been handled in this manner the cloth is dampened and the doll is rolled up, care being taken not to move the grains from their original position. Then a rubber band is placed around each end of the doll and the doll and rack are numbered with duplicate tags. When all the dolls are filled, they are placed in the germinator box.

The germinator box is made of an inner and outer box with dampened sawdust packed tightly between them. The inner box can be any size. Ours is twenty-one by fifty-four inches and holds two thousand two hundred and forty ears. The outer box is large enough to allow a four-inch layer of sawdust between the boxes. The inner box is sectioned into spaces three inches square by means of small cross-wires. The dolls are placed in the germinator, standing upright, and the box is covered with grain sacks. The dolls and sacks are sprinkled thoroughly twice each day with warm water. The box is placed in a room where the temperature can be kept at approximately 85 degrees F., and at the end of a seven-day germination period the dolls are ready to read.

When the dolls are unrolled, the first thing to notice is the germination. Any ears which show weakness or do not have 100 per cent germination should be discarded. Many grains will show mold growths and root rotting, which conditions are caused by the diseases in the corn. These diseases do not prevent the germination of the corn, but merely weaken the corn plant and therefore should be discarded.

There are five diseases which are more or less common in our locality. The worst one is fusarium, or root rot. This disease often causes a decrease in yield of from five to fifteen bushels per acre according to the test plot data. Diplodia, or dry ear rot, is the next in importance. The remaining three are of minor importance except as they lower the vitality of the corn to a limited degree.

Of a total of 14,564 ears, 11 per cent. showed poor germination and 16 per cent. showed disease. This 27 per cent. represents the most outstanding feature of the entire work because the elimination of this insures to a very large degree a good stand of healthy stalks and an increased yield.

Another interesting result of the tests was to show that a diseased ear cannot be detected even by a most careful examination. It must be tested if the disease is to be found in most cases. Much encouragement was given the school and the men in charge of the work by the fact that so many good farmers were interested in the disease test. More than one hundred different men visited our laboratory during the work. Many of them came from a distance and

(Continued on page 72)

"Purdue Calf Meal" as a Milk Substitute

By J. J. Schoen, '23.

FOR many years there has been a desire among dairymen to secure a milk substitute for the rearing of young calves. This desire and need has increased as the cost of milk production has increased. There is no doubt that whole milk is the ideal food for the growing animal, and that skim-milk has proved to be an excellent substitute for whole milk after the calf has reached the age of two to three weeks, but the supply of skim-milk also is limited and too expensive, especially with dairymen, who supply the consumer with whole milk.

A group of twelve calves fed Purdue Calf Meal. The results of feeding trials showed that this substitute for milk makes a reasonably satisfactory feed for young calves.

The Purdue University Agricultural Experiment Station, under the direction of Dr. Geo. Spitzer and Dr. R. H. Carr, has been studying the problem of how to find a calf feed that would furnish in easily digestible form the food elements necessary for the young calf. A number of feeding trials have been made with a feed devised by the Dairy Department and careful records have been kept.

From the results of past experiments it was seen that there was a great difference in the digestibility of the different feeds, and consequently in their utilization for growth. Important considerations in a feed for young calves are the character and quality of the proteins, together with their ease of digestion, and assimilation. Because of the insoluble condition of dried blood protein as found on the market, a feeding trial was made by using liquid beef blood, which supplies the animal protein in a very soluble form.

It was proved by this experiment that liquid blood could not become a practical milk substitute for two reasons: first, its poor keeping quality; and, secondly, liquid beef blood could not be obtained on a commercial basis.

From results obtained through feeding experiments the "Purdue Calf Meal" mixture was obtained. The proportions are: corn, 3 parts; oil meal, 1 part; and liquid blood, 12 parts (corresponding approximately to three parts of dried blood). In preparing the mixture particular attention was given to the drying, for it is generally accepted that continued high heat causes the proteins to become less soluble and digestible in the alimentary tract. In order to avoid the effect of high heat, the mixture was dried at a temperature not above 140° F. The feed was then ground fine enough to pass through a forty mesh sieve.

After several experiments conducted with a small number of calves, it seemed advisable to try this prepared calf meal with a larger number of calves in comparison with skim-milk and whole milk, so thirty-six calves were put on trial. They were divided into three lots of twelve each—one lot fed on whole milk, another on skim-milk, and the third on Purdue calf meal. Lots 1 and 2, fed on whole milk and skim-milk, re-

received milk in proportion to their live weight, 10 pounds of milk daily per 100 pounds weight. This ratio was continued until the calves weighed 200 pounds and were receiving 20 pounds of milk. Lot 3, fed on Purdue Calf Meal, received 4 pounds of calf meal for each 100 pounds of live weight. The meal was weighed and placed in a container of sufficient capacity to hold the mixture when properly diluted. To the meal in the container four times its weight of warm water (160°-180° F.) was added and well mixed. This was left standing for one to two hours. In order to further dilute the calf meal to 1 part calf meal to 9 parts water by weight, a weight of water was added equal to the weight of the diluted mixture already obtained. Of the latter mixture it would require 4 pounds of the diluted feed to each 100 pounds of live weight. In order to obtain the required amount of liquid mixture to feed each calf, multiply the weight of each calf expressed in hundredths by 4.

All calves were fed a grain ration composed of equal parts of ground corn and oats. The calves had access to good clover hay, in sufficient quantity to meet their wants, and were watered at regular intervals.

This experimental feeding was continued for 140 days. After this period all calves of the three lots were put on blue-grass pasture, all lots having the same natural environments and attention.

The average daily gain in weight of the different lots during the experimental feeding of 140 days was:

Lot 1—Whole milk ration....1.91 pounds
Lot 2—Skim-milk ration.....1.73 pounds
Lot 3—Purdue Calf Meal....1.18 pounds

The average daily gain of the different lots during the six months when put on pasture was:

Lot 1—While milk ration....1.16 pounds
Lot 2—Skim-milk ration.....1.24 pounds
Lot 3—Purdue Calf Meal....1.18 pounds

The development of the calves when on pasture indicates that the feeding of Purdue Calf Meal seems not to have impaired or stunted the growth, as the gain in weight of the calves fed Purdue Calf Meal was equal to the gain in weight of the milk-fed calves while on pasture.

Purdue Apple Show

The sixth annual Purdue Apple Show is to be held this winter at West Lafayette during Farmers' Week. The students in charge are getting things under way and are determined to make it the biggest and best show ever held at that place. With the abundance of good fruit in the state this year there should be no difficulty in doing this.

As usual fruit will be exhibited in classes. Besides the classes for Purdue students there will be special classes for Commercial Growers' Exhibits and for High School Students' Exhibits. Persons interested are urged to select their fruit early and get it in storage. Premium lists may be obtained by writing to Mr. N. W. Kempton, Manager Purdue Apple Show, 1109 South St., Lafayette, Ind.

A feature of the show this winter will be a vegetable exhibit, to be conducted by the Vegetable Gardening Students. This is something new and will add greatly to the educational value of the show.

The officers in charge are Mr. N. W. Kempton, manager; Mr. C. A. Garner, assistant manager and in charge of the vegetable exhibit; Miss Helen Vickery, in charge of pie exhibits; Mr. W. S. Oberlin, chairman of committee on arrangements; Mr. O. R. Hensler, chairman of committee on premiums.

The time of year is approaching when the person who grows roses must think of their protection for the winter. As soon as the ground freezes, the rose bed should be covered with a heavy mulch of strawy manure. The tops may be covered with a box, paper sack or anything that offers some protection. The more tender varieties must be covered completely with straw or leaves. The straw may be tied up about the plant which is left erect and supported by a stake or the plant may be laid down and covered more easily that way.

The dairy judging team representing Purdue at the National Dairy Show placed fourth among the twenty-one teams entered. Not so bad, eh!

Tuberculosis in Livestock

By F. J. Hemmer, '22.

IN recent years much discussion concerning a larger and better livestock industry has centered about the disease of tuberculosis, and the losses directly attributable to it. It is extremely difficult to accurately estimate the financial loss to cattlemen through this disease, because of the various ways in which it affects the financial interests of the livestock feeder, breeder, and milk producer. Tuberculosis is responsible for loss to the cattleman in the following ways:

The tuberculin test weeds out diseased cows like this one.

1. By destroying cattle outright, as when it is allowed to develop and kill its victim.

2. By reducing the breeding value of a herd and its general productivity.

3. By causing a waste of feed that can not give an adequate return.

4. By infecting other animals, such as calves, swine and other cattle.

5. By injuring the reputation of the herd, thereby rendering it difficult to dispose of the animals or their products. Statistics show that 10 per cent of all milk cows in the United States are affected to a greater or less degree, 1 per cent of all beef animals, and 2 per cent of all hogs.

From the standpoint of safeguarding public health, the eradication of bovine tuberculosis is of extreme importance. Human and bovine tubercle bacilli are of two distinct types. Adults are rarely infected with the bovine type of the disease, but young children suffer to a considerable extent. Calves and pigs are infected by feeding them milk from diseased cows, thus proving the presence of tubercular bacilli in milk, which is a dangerous carrier.

A test, called the tuberculin test, has been discovered for detecting a diseased animal and has proven itself very accurate. In 1918, 23,869 cattle were slaughtered that had shown a tubercular reaction and upon post-mortem examination, 23,585 of these showed tubercular lesions.

The word tuberculosis is taken from the Latin word tuberculum, meaning rounded prominence. In affected animals, smooth, rounded tumafactions are found protruding from the serous membranes lining the larger cavities of the body. The organism causes the disease by multiplying within the tissues and consequently destroying them. The lungs and thoracic glands are most commonly attacked. It may, however, attack any of the abdominal organs, and even in rare cases the spinal cord and brain may be affected.

The symptoms depend upon the location and extent of the lesions. When deeply situated and not extensive, the animal may show perfect health and for a considerable time retains its good feeding qualities. No

general "usual" characteristics can be given; however, certain general manifestations of the disease appear in advanced stages, as emaciation, harsh skin, while appetite may be good. This, when accompanied by a rough coat, a cough and a tight harsh skin is a suspicious indication. In many cases apparently well individuals, presenting no outward symptoms of the disease, have considerable tubercular tissue.

The tuberculin used in the test is a liquid upon which cultures of the tubercule bacillus have been grown until it was saturated with the metabolic products of the organism, and then had the bacteria removed from it. It has no definite curative or immunizing effect, its value being only as a diagnostic agent.

In the application of the tuberculin test a few general rules must be observed to obtain accurate results. It should never be applied to an animal already known to have some other infectious disease. It should also not be used on a cow advanced in the period of pregnancy. The tuberculin is applied subcutaneously, usually in the loose skin of the neck, or, in animals having an abnormal or fluctuating temperature the opthalmic test is frequently used. This consists of placing a disc containing tuberculin in the eye of the animal. If infection exists there follows a formation of pus in the eye.

Temperatures must be taken every two hours for six hours previous to the application, to see if the animal has an abnormal temperature. Beginning six hours after injection temperatures should be taken hourly or at least every two hours for eighteen hours. If a rise occurs in any one individual the temperature should be taken at like intervals until it returns to normal. A "reaction" usually consists of a rise in temperature beginning about the sixth hour and continuing for several hours. The rise varies from 1° or 1.5° F. to 4° or 4.5° F., above normal. This should be a gradual rise, a continued high temperature (two to six hours) and then a gradual decline.

The responsibility for freeing herds and keeping them free from tuberculosis rests with the owner and not with the state or federal authorities. Obviously there is not a sufficient number of state and federal inspectors to test all the cattle in the United States, nor is it desirable to conduct a campaign on that basis. In practically every section of the country there are qualified veterinarians who will test the cattle with tuberculin and can advise how to handle the herd so as to free it from the disease and keep it free.

The accredited herd plan, by which owners of tuberculosis-free herds receive state and federal recognition, has met with favor among breeders of cattle everywhere, and it is reasonable to expect that this plan will be followed until most of the pure-bred herds of the country are under supervision. Dr. E. B. Haskins, 33 State House, Indianapolis, Ind., is the federal inspector in charge for Indiana, and owners desiring information or assistance in relation to their herds should get into communication with him or with the State Veterinarian at Indianapolis.

Home Economics Classes in Indiana

By Inez M. Richardson.

THE Home Economics class has become a permanent factor in the development of rural life among our home makers in Indiana.

It might be interesting to know that the first efforts toward such an organization in Indiana were made by Miss Gertrude McCheyne and the Farmers' Institute workers in 1910. During that year twelve such classes were formed, representing ten counties. At that time Home Economics work was comparatively new in our State, and these organizations needed much assistance in regard to organization and outlines of subject matter for programs. These outlines were prepared and sent out from the Home Economics Extension Department of Purdue University, and were very miscellaneous in content.

As the organizations became older they developed more and more into community clubs, and now there are approximately 250 clubs in fifty-eight of our counties. With the realization of the broader scope of Home Economics and the greater relation of the

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THE PURDUE AGRICULTURIST

Published monthly during the school year, by Agricultural Students of Purdue University, LaFayette, Indiana.

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The purpose of THE PURDUE AGRICULTURIST is to disseminate the latest scientific knowledge concerning Agriculture and Home Economics, to incite the young people of Indiana to a greater desire for training in Agriculture and in the industrial pursuits, to publish matters of interest concerning the Purdue School of Agriculture and the Purdue Experiment Station, and to afford opportunity to the students for training in Agricultural journalism.

FARM RECORDS AND ACCOUNTS.

FARMERS as a class are decidedly lax in the keeping of records and accounts. While it is true that a complex system of bookkeeping is not needed on the farm, yet it is highly imperative that accurate and well systematized records be kept.

Viewed from a business standpoint farming is exceedingly complex and involves innumerable details. And if the farm is average size or above it is almost impossible to hold these details in mind. Many neighborhood quarrels have arisen over disputed debts of which no record had been made by either party. Likewise, many of the disputes between landlord and tenant can be attributed solely to the absence of a written contract.

The four important factors in the success of a farm business are: size of business, yield of crops, returns from livestock, and efficiency in the use of labor. But how many Indiana farmers have an exact knowledge regarding any one or all of these factors in their own business? Ask any farmer the size of his business and he can give you only an approximation. And if perchance you should ask him what returns his livestock yielded or how many crop acres per man he averaged for the past year, he is completely stumped. Yet these are pertinent questions regarding things every farmer must know before he can possibly locate and eliminate the weak spots in his system of management.

The income tax legislation has focused the attention of farmers upon the importance of knowing the labor income and has compelled many of them to keep some sort of financial record. Most business men can tell you their yearly profit or loss, but the farmer cannot. Yet definite and authentic knowledge of this one point is very important. For why should a farmer continue his business at a loss? Or why should he move to the city if he can and does make more on the farm? Without a complete and accurate record of the year's business it is impossible to determine the yearly labor income.

Many farmers recognize the importance of keeping records, but are nonplussed by the difficulties encountered. Bookkeeping systems adapted to the ordinary city business are entirely unsuited to the farmer's needs. Any system to be practical for the farmer must provide for an inventory at the beginning and end of each year, a record of itemized expenses and receipts, and a form for determining the yearly labor income. The Extension Department of the Purdue Experiment Station puts out a Farm Record Book which fulfills these requirements admirably. This book has blank forms for recording the entire year's business in a simple yet efficient system, and should be in the hands of every farmer. It can be procured for the nominal sum of 15 cents

by addressing the Purdue University Agricultural Extension Department, West Lafayette, Ind., and asking for the Farm Record Book. Order your copy now, study its plan carefully, and be ready to start the new year with an up-to-date, practical system of farm records and accounts.

THE POULTRY SHORT COURSE.

The summer season with its cultivating and harvesting is over; fall with its harvesting and storing is nearly past. Now is the time when the farmer can spend a little time studying the latest improvements in his business with a view to eliminating former inefficiencies and enlarging his plans for the future.

For those who appreciate the efficiency of poultry as utilizers of raw material which would otherwise be largely wasted, the Poultry Short Course should prove a decided attraction. The course as planned will be held December 6-18, 1920, and will present the following subjects of instruction:

1. Housing and fixtures.
2. Incubation and brooding.
3. Feeding of chicks and laying hens.
4. How to select good layers and cull the poor ones.
5. Selection and care of breeding stock.
6. Poultry management.
7. Diseases—their prevention and treatment.

The course will consist of lectures, demonstrations, and laboratory exercises, presented in such a manner as to give each member of the class a practical working knowledge of the subjects covered. The entire poultry farm, with its equipment and stock, will be available for instructional purposes. The experiments that have been and are being conducted by the Poultry Department, will bring out many new and practical points of the poultry business. A complete outline of the course, together with instructions regarding registration, is being published in a little folder which may be secured by writing to the Office of Poultry Husbandry, Purdue University, West Lafayette, Ind.

Other Short Courses to be presented by the Agricultural Department during the winter are:

1. Farmers' Short Course, January 10-14.
2. Winter Course, January 17-March 11.
3. Buttermakers' Course during Winter Course.
4. Creamery and Fieldmen's Course, January 24-29.
5. Three tractor courses of two weeks each, and beginning on the following dates: January 13, February 14, February 28.
6. Fruit growers' Short Course, February 7-11.
7. Canners' Short Course, February 21-25.

These courses are all intended to be of practical value to the wide awake, progressive farmer. Can you afford to miss attending the course which interests you most?

THE AGRICULTURAL GRADUATE'S OPPORTUNITY.

It does not matter where a man may locate after his graduation, his chief interest lies in his immediate community rather than in his city, county, or state. He wishes to make this home community a better place in which to live by bringing about better social conditions and better homes, by suggesting new ideas and more profitable practices for the farming operations, by introducing improved live stock and higher quality of seed. And it is here that his greatest opportunity for service and leadership lies. While huge constructive movements are being constantly initiated which may include even the nation in their scope and which help to revolutionize agricultural practices, yet all real advancement and development must be carried on in the small unit. And so it is that here the demand for leadership is greatest, and great national strides are dependent upon the advancement made in the thousands of progressive rural communities rather than upon a great centralized organization that can only suggest, direct, or initiate and not really establish without such aid.

So one of the most essential qualities of an agricultural graduate is his ability to lead—to be a man known for his character and his standing, his ability to farm successfully, and to accomplish what he undertakes. The future for the graduate who would render what he believes or hopes will be real benefit to humanity lies in his ability to go to his community, acquire and hold its confidence, and be a leader in all that is good and progressive.

IS YOUR MACHINERY HOUSED?

The time of year has arrived when, as written by one of our Hoosier poets, "the frost is on the punkin and the fodder's in the shock." Yes, your silos are all brimming full, the haymows overflowing, and grain bins swelled. Your wheat has been sowed and everything is in readiness for the arrival of winter. In contemplating the preparations for the long cold season, have you made adequate preparation for the care of your machinery? Do you remember last spring when you started to plow for corn? You were in a great hurry, but you lost half a day in going to town to get necessary repairs and in scouring the rust from the plow which had set under the apple tree all winter. Then when your wheat was dead ripe you remembered that you had broken a casting just at the end of the previous season, and you lost a valuable day in finding and installing the necessary repairs. The loss to you in bushels of wheat you were unable to calculate.

Why not do away with all this loss of time and money? At this time of year work is a little lax. Work done now in housing and repairing your machinery will mean dollars in your pocket during the rush season of next year. Put the plow in the tool shed and cover the metal surfaces with a film of oil. Put the mower in the dry shed and repair the loader for use in haying next year. Repair the tongue that you broke out of the binder on that rough ground last year. Start the spring season with everything in first-class order and with the determination to lose no time on poorly cared-for tools.

THE AG'S DEBT TO PURDUE.

Right now it is up to the Alumni of Purdue to prove that they are not behind in carrying out their duty to their alma mater. Have all our Ag Alumni given the Purdue Union their sincere thought? Do they thoroughly realize that their support is worth more just now than at any future period?

Ultimately every Purdue Alumnus will be a life member of Purdue Union. When the campaign is ended practically 100 per cent of the Alumni will have a point of common interest—something that has heretofore been lacking.

Furthermore, this common interest is an investment that pays well for the future. A larger per cent of the Ag graduates reside in this state than of the engineers. They, consequently, have a closer contact, and are more inclined to send their children to Purdue. Already many of the second generation can be found on the campus. For these sons and daughters every graduate wants a better, happier environment than he had for himself. He is willing to sacrifice, if necessary, to make that provision for his children which will mean a broader education.

What do you say, "Ags"?

The total amount pledged to date is $175,000. The real campaign is just beginning. The students will do their share and more. Why wait? Take a membership today. Make the total more than $500,000 by home-coming.

The Potato Wart Disease

By T. J. Mellinger, '21.

ANOTHER formidable enemy of the potato has been found to exist in the United States. This very serious disease is well described by the name potato wart. Fortunately it is now confined to a small section in Pennsylvania where it is fairly well established. It is not a new disease to science, for it was discovered in Hungary in 1896, and has also been known as potato canker, cauliflower disease, warty disease, black scab, and black wart. There is strong belief as well as some evidence in hand that it existed in England as far back as 1879, but nothing was published on it until 1902. Now, it is pretty widely distributed all over the British Isles. The disease did not make its appearance on this side of the Atlantic until 1909, when it was discovered in Newfoundland.

Because the disease was of such a nature that it could be introduced on imported tubers, and since importations were being made from both Europe and Canada, and because the disease was without doubt one of the most serious ones threatening the potato crop, very much alarm was caused

by the introduction into this country. Several publications were put out in 1910 and 1912 by the U. S. Department of Agriculture warning people against its spread. In fact, the potato wart was considered so important that it was the basis of the third quarantine. Up to this time only two had been issued, No. 1 was directed against white pine blister rust and No. 2 against the Mediterranean fruit fly. The act was approved August 20, 1912, and potato wart quarantine went into effect two months later. It prohibited importation from all areas known to be infected, which included Newfoundland, the Islands of St. Pierre and Miquelon, England, Scotland, Wales, Ireland, Germany and Austria-Hungary. The quarantine is still in effect.

All importations stopped and several years passed without the deadly malady being discovered in the United States. We had escaped! Then like a thunderbolt from a clear sky it was discovered in Pennsylvania several years after the alarm of the danger of its being introduced had subsided. It was first discovered in east central Pennsylvania and recognized by Mr. J. G. Sanders, Economic Zoologist of Pennsylvania, from a specimen sent him from Highlands, in Luzerne county. It was in September, 1918, that this discovery was made. There is much evidence that the disease existed there many years before this.

The infested part of Pennsylvania is in a mining region, there being no land cultivated except the gardens, the produce which is grown is only for home consumption, and there are no areas lying close which are cultivated. Then it does not seem likely that potatoes or truck, which might bear this disease, would be sent out of this region. Yet the disease has been so virulent and spread so rapidly in other countries where it has already become established, that it must always be looked upon with a great deal of alarm, and all potato growers should know about it. It is a very real danger and it will not only destroy the crop or ruin it beyond recovery, but will render the soil unfit for potato cultivation for several years.

The situation was a difficult one to control, for one must remember that the population in this region is mainly of foreign birth and it is difficult to present the case to them. When the investigating parties set out to find the areas infected, they first went to the wholesale houses where supplies of potatoes both for consumption and seed were stored ready for distribution. They examined these and then tried to trace down small batches that had been sent out to small stores. In some cases they came up with parties to whom the small grocers had sold the potatoes, and these were foreign people who naturally look with great alarm upon any acts which in any degree were suspicious to them. When some one went into a garden and began to look around the owners would run out with their arms in the air and try to oust the intruder. Many of them tried to use force. The disease is usually characterized by warty outgrowths, which give rise to the common names given to it. These outgrowths vary in size and distribution, but for the most part they appear on the tubers, having their origin in the eyes. They may, however, occur on the sprouts, on the lower portions of the stem and in rare cases on the roots. This warty mass is somewhat like the Crown Gall disease known on other plants. Then the seriousness of the disease is apparent when we know that it is evident only at digging time. Some men claim there is a noticeable effect, due to its presence, when the tops are greener in bad cases. The warts are at first whitish in color but later on turn a black color, which is the basis of the name "Black Wart." When they are on the ground they take on a green color, and the warts may be varying in size, from that of a pea to that of a potato, and may resemble these very much. In many hills some tubers may be apparently healthy, when in fact they probably are infected in the eyes. It may be difficult or almost impossible to recognize the presence of the disease in the early stages, and it is by this means, using apparently sound tubers for seed that the disease has been spread in the infected regions. Fortunately these regions are small.

There are four lines of attack for the prevention of any disease: exclusion, eradication, protection, and immunization. Our first one, or the attempt at exclusion has failed, because in nearly all of these cases the disease has made its entrance into the country while the authorities were trying to get through the bill for the quarantine—red tape. But it is possible to exclude the disease from other parts of the country.

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Alumni and Local

PURDUE WINS FROM DEPAUW.

The largest crowd which ever attended an early season football game saw Purdue down Depauw, 10-0.

Coach Scanlon did not allow his men to use anything but straight football, and did not intend for coaches from rival conference schools to get a line on his team. One thing was evident though, to anyone who witnessed this game, that Purdue still has a team that fights and fights hard from the first minute of play until the last.

Such spirit and team work as displayed by the Boilermakers certainly bodes ill for any and all opponents.

THE PURDUE UNION.

The Purdue Union campaign is now on in full force, and now is the time to back up all those good things you have been saying with a liberal donation. Do not necessarily confine yourself to the minimum which is set at $100 for each graduate or $50 for ex-men, but pay in proportion to your means.

Touchdown against DePauw.

DID THE BEST TEAM WIN?

Everyone who saw the annual clash, and it can be rightly called such, between Purdue and Chicago at Stagg Field, October 9th, has asked himself and his neighbor that question. It is the general impression that it did not, for although Purdue came out on the short end of a 20-0 score, it is not representative of the comparative strength of the two teams or the battle they put up.

Outweighed, but not outplayed or outfought, Purdue held the heavy Maroon line and carried the ball into enemy territory only to lose it through some ill-break of luck.

It is not good to go to other universities and see their Union buildings, the memorials of the Alumni to their alma mater, and think we cannot do as well. Here we have been talking about Purdue Pep for some years, ever since our existence as a University, for in fact all our traditions are based on this outstanding feature. Now is the time to show the meaning of Purdue Pep.

This is the time to remember you are still an active part of that great institution called Purdue, and in order to do this you must get away from the idea that as soon as your degree has been conferred, you can isolate yourself and forget the debt you owe your alma mater.

When Heavy Crop Production Pays

By J. B. Tipton, '21.

IN considering when heavy crop production pays, the problem can best be approached from two angles: (1) when there is heavy production of the particular crop in regions best suited to its growth, and (2) heavy production on individual farms due to intensive methods.

Taking up the first point, we immediately observe that during some years there are heavy yields, while in other years the yield is appreciably lighter, whether the number of acres remains constant or increases.

During the decade, 1901-1910, corn in Illinois varied from 21.4 to 39.8 bushels per acre as an average yield; wheat in Kansas from 10.4 to 18.5 bushels, potatoes in New Jersey from 59 to 132 bushels, and cotton in Texas from 125 to 155 pounds.

Rainfall is the chief cause for this variation.

Naturally when there is a "short" crop, prices are high, and when there is an overproduction prices are low. After a year or longer period of high prices for a particular crop, farmers are frequently advised to increase the area allotted to it or to greatly increase the yield per acre, or both, and too often do so. If this advice is generally followed and production as a whole is too great, the price drops, so that the crop may be and usually is worth less than a normal crop. For products that are easily stored and preserved, such as grains grown in the corn-belt, the years when yields are highest are often the years of highest value per acre, but perishable products, like peaches, apples, watermelons, potatoes, and cabbages, are particularly open to the danger of overproduction. In such years, fruit may be not even worth picking; this was actually the case with the Texas peach crop in 1912, and is occasionally true with apples. On some farms, in 1910, potatoes sold for ten cents a bushel.

Heavy yields in a restricted area or on individual farms give satisfactory profits when there is a general shortage. The amount to be consumed on the farm also has a direct bearing on the amount raised, as higher prices will not compensate for a short crop in years of production when the amount to sell is small.

As a natural consequence, these years of high and low production and correspondingly low and high prices result in cycles of over and under-production that can be foretold with approximate accuracy. With the annual crops the acreage varies but little, but with crops requiring longer periods there is greater variation: the longer the time required, the more pronounced the periods of over and under-production.

Take apples in the New England states, for example. The crop paid well from 1854 to 1864, and very well during the next decade. But new orchards which had been planted due to these satisfactory prices came into heavy bearing about 1878, when prices dropped rapidly. In 1896, thousands of bushels were not picked. Since 1896 prices have been rising, and another period of planting took place between 1904 and 1908 which should greatly lower prices about 1920 to 1925.

The best rule in such cases is to "sell on a rising market and buy on a falling market." As Warren puts it, "When the majority are disgusted with the business is a good time to buy; when the majority are declaring that prices will never again be so low is a good time to sell." *

The subject of intensive and extensive methods as regards the most profitable production is quite interesting and important. What a farmer desires is the most profitable production, not the heaviest yields. Where expense is not an item, any one should be able to secure yields far above the average. Whether such yields will pay is what concerns the practical farmer. Doubling the yield is so far from doubling the profits that it may be and often actually is accompanied by a serious financial loss.

Efficient management will result in fairly satisfactory profits with ordinary production, while many farms that secure large yields per acre often fail to make a good profit. A combination of efficiency and good production gives the greatest profits. Most farmers could grow larger crops with justifiable results; others are employing too intensive methods.

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*G. F. Warren, "Farm Management," p. 88.

Fall Practices for the Control of Insects

By W. S. Oberlin, '21.

THE old adage, "an ounce of prevention is worth a pound of cure," is never more true than in the control of insect pests, for a control measure to be most successful must be applied before the insects have done any damage. Many insects may be controlled to a very large extent by the use of proper methods in the fall of the year. The method of control by fall practices is determined largely by the way in which the insect passes the winter, therefore, a knowledge of the life history and habits of the insect is essential in determining the practice best adapted against any particular pest.

After a crop has been harvested there is usually some portion which is allowed to remain on the land. In this refuse the insects peculiar to the crop often feed and multiply until late fall and then hibernate over winter, insuring possible injury to similar crops on the same or adjoining land the following year. Thus the wheat joint worm winters in the stubble and the chinch bug commonly hibernates in bunch grass in or adjoining corn fields and may be largely controlled by plowing under the stubble to prevent the emergence of the joint worm adults the following spring, and by burning the grass to destroy the hibernating chinch bugs. Where other agricultural practices permit it is desirable to destroy crop refuse remaining after harvest by plowing it under or burning, depending on the crop and insect involved. Often the crop refuse is put in piles and left until the insects collect in it, after which time it is burned or otherwise destroyed. The Harlequin cabbage bug, squash bugs, onion thrips, asparagus beetles, striped cucumber beetle, and many other important injurious insects hibernate as adults in trash or remnants of crops and may be partially or completely controlled by these sanitary measures.

Fence rows and all waste land should be cleaned thoroughly and burned over to destroy the hibernating stages of such insects as grasshoppers, chinch bugs and army worms. Destruction of weeds destroys such insects as the cornstalk borer, thrips, and tarnish plant bug, as well as many other pests which winter on or in weeds.

Where conditions will permit thorough and deep plowing in the late fall is a very desirable practice, as it destroys many of the insects which hibernate in the soil. The way in which fall plowing affects the insect depends upon the winter habits of the insect in question. Thus, it may destroy the insect by breaking up its winter cell, exposing it to severe winter conditions, or the insect may be buried so deep that it will be unable to issue the following spring. Cut worms pass the winter in the soil as larvae; the corn ear worm hibernates in the pupa stage; while the May beetle, or white grub, and the click beetle, or wire worm, hibernate as newly transformed beetles or as larvae. But all of them will be destroyed by breaking up their winter cells. Grasshopper eggs are layed in the fall just beneath the surface of the ground, and the eggs of the stalk borer are deposited on weeds and grass and by late fall plowing they will be buried so deeply that but few, if any, of the young will be able to emerge. The apple maggot hibernates in the pupa stage just beneath the surface of the soil, and by deep plowing the puparia may be buried so deep that the adult flies cannot successfully emerge.

Community co-operation is of greatest importance in the control of insects, for while the individual farmer will invariably secure profitable results the practices recommended must be applied throughout a community to be thoroughly effective. The fall is an opportune time to give the farm a general cleaning up, and a clean-up practice properly applied will mean less trouble with insects and weeds the following season. All rubbish and crop refuse should be burned or destroyed in some manner. The fence rows and all waste land should be cleaned thoroughly and burned and fall plowing should be practiced whenever possible. If these methods are followed carefully there will be much less loss and worry from many of our more common insect pests.

J. C. Allen, ex-Purdue man, was chosen as the photographer for the National Swine Show held at Des Moines, Iowa.

Purdue Host to Poultrymen

Annual Convention of Indiana State Poultry Association Held at University.

THE members of the Indiana State Poultry Association held their annual convention at Purdue University October 7, 8, and 9. During their stay here the poultrymen discussed topics of vital interest to the farmer, the fancier, the baby chick producer, and the commercial poultryman, and also started a movement looking toward greater financial support from the state for the Agricultural Experiment Station.

The meeting opened Thursday afternoon with a culling demonstration of a farm flock, the purpose of which was to show not only how to cull, but also how culling demonstrations should be conducted.

An important phase of the poultry industry to which considerable time was devoted this year is the baby chick business. This subject was discussed at an informal supper conference Thursday evening and also at the Friday morning session. As indicated by these discussions the baby chick business is an important part of the poultry industry in Indiana. There were twenty-one men present who make a business of producing day-old chicks. Their incubators have a capacity of 517,000 eggs, and last year they hatched at least 1,500,000 chicks, representing a value of about $400,000. After a discussion of the advisability of forming a baby chick producers' association, a committee was appointed to consider this matter.

Friday afternoon was devoted to an inspection trip to the Purdue Poultry Farm and to a demonstration in utility judging.

Friday night a banquet was held at which the different speakers told of the development of the poultry industry and of the opportunities offered by this line of work, showing that the poultry business is an important and paying proposition. Prof. G. I. Christie told briefly of the development of the poultry industry in the state during the past ten years and explained the experimental and extension work being done by Purdue. Mrs. William Goldsmith, of Spencerville, Ind., gave an interesting account of her several years' experience in developing a high producing strain of Rhode Island Reds. Another interesting feature was the story by A. C. Manwaring, of Mentone, giving an account of how, having started with a small capital seven years ago, he has gradually increased the size of his poultry farm until at present he has one of the largest commercial poultry farms in the state, with a flock of 3,500 laying hens. Mr. Manwaring stated that in his opinion a commercial poultry farm is the best, safest, and most profitable farm enterprise in the state, and extended a cordial invitation to anyone who doubted this statement to visit his farm where he would prove his statement.

Prof. A. G. Philips, head of the Purdue Poultry Department, discussed some of the handicaps which the department has undergone during past years and some of the problems with which it is confronted at the present time due to lack of finances.

There was a discussion of the matter of finances for the Agricultural Experiment Station. The matter was taken up in detail and a committee was appointed to work out a plan to be presented at the next session of the legislature, asking for greater financial support for experimental and extension work.

The meeting was concluded Saturday forenoon with a brief program and business meeting, at which the following officers were elected: U. R. Fishel, Hope, President; A. C. Manwaring, Mentone, Vice-President; LeRoy L. Jones, Purdue, Secretary-Treasurer. Executive Board—Theo. Hewes, Indianapolis; M. A. Kenner, Huntington, and L. J. Demberger, Stewartsville. Chairman of the Committee on Legislation, M. S. Barker, Thorntown. Chairman of the Committee on Education, Prof. A. G. Philips, Purdue.

Among the officers and members of the different committees are farmers, fanciers, baby chick producers, commercial poultrymen, and men engaged in educational work, representing every phase of the poultry industry. The wonderful spirit of co-operation existing between those engaged in these different lines of work makes possible the solution of many problems that are of vital interest to the poultrymen of the state.

I. L. Baldwin, '19, is an instructor in the bacteriology department at Purdue.

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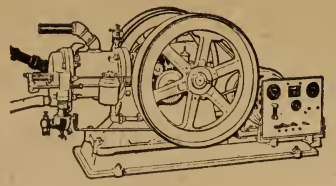

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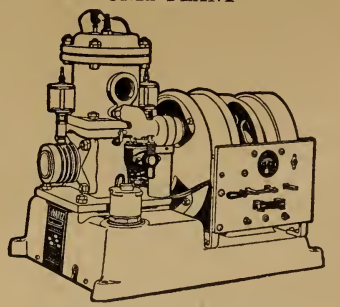

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The High School Girl and Her Clothes

By Mary L. Matthews.

TO no group of girls are clothes more absorbing than to high school girls; among no group do we find more wrongly dressed girls. Constantly do mothers worry about the way these girls dress, often criticizing, condemning and finding fault, without analyzing the situation.

The high school girl has reached the age when "to look pretty" means more than almost anything else. Her tastes are not yet definitely formed and her judgment is poor, but she wants to express her own ideas in choosing her clothing. The wise mother is the one who guides her in this selection, never apparently forcing the girl to adopt other than her own standards.

"All girls should grow into womanhood with these rules on clothes well fixed in mind: in color, harmony; in cut, modesty; in cost, consistency; in time, appropriateness; and always is cleanliness indispensable." Henry Ward Beecher said, "Clothes do not make the man, but they make him look a lot better after he is made."

Every woman, every girl should dress to bring out the best points about her face and figure; she should wish to be as attractive as it is possible for her to be. The wrong colors may entirely spoil the effect; the wrong lines may spoil the figure; the wrong care may spoil the best of garments.

It is a wise plan to make a study of clothing before condemning or criticising the garments worn by others. Only a few people are born with a sense of correct taste in line, form and color, and for this reason it is wise to make some study of the opinions of others whose training has made them authorities.

The high school girl loves color, and her taste for this should be gratified, but in a way that does not make her conspicuous or displeasing to others. In nature the large masses of color are dull, while the bright color is used only in small amounts here and there. The school or street dress that is a dark color looks best and may be relieved or brightened by a bright tie or hair ribbon, or by a bright string of beads. Bright scarfs and sweaters worn with white dresses please the eye and gratify the girl's love for color.

All colors worn should be becoming. To decide whether a color suits the complexion it should be tested by draping it about the face and looking in the mirror to see the effect. It is wrong to consider red, crimson or bright rose suitable to all girls, for when one has a great deal of color in one's face or has auburn hair it is a poor selection. Colors in the costume should harmonize with each other.

The high school girl's dresses should be of simple design. She needs no elaborate laces, embroidery or combinations of expensive materials to make her costume attractive. Rather should she have dresses made of good, yet of the less expensive materials with little trimming and made in simple design. The Hofflin or the Peter Thompson suit is always appropriate for the high school girl to wear because it is well made and suitably designed. For the dress-up occasion a simply made silk dress is suitable. For evening parties the high school girl needs no satins or velvets, but rather should she wear such materials as organdies, mulls, nets or silks, light in color; bright, if desired, but always becoming. Very low necked or sleeveless dresses are not suitable for the high school girl because usually her neck and arms are too slender and not beautiful, and if the mother is wise the girl of high school age will not be going to parties where such dresses are appropriate.

Commencement dresses for the high school graduation are often the cause of much comment, discussion and sometimes ill-feeling. No girl is kind who wears the costume that is more elaborate or more expensive than any other girl in her class can afford. Simply made white dresses of such materials as organdies, lawns, dimities and voiles are much more suitable than satins or silks. The dresses should be made without much trimming other than ruffles, simple lace edgings, tucks or dainty embroidery. No young girl looks her best wearing high heeled slippers or fancy shoes on such occasions. Because of the poor judgment used in selecting the girls' commencement clothing many high schools have adopted a uniform for commencement wear because by such an arrangement ill-feeling can be

(Continued on page 67)

The Economic Importance of Birds

TO the farmer, whose time is so filled with the many duties of plowing, sowing and reaping, live stock management and the other hundred and one responsibilities of running a farm successfully, seldom if ever comes a full realization of the numerous friends and foes at work in every nook and corner about the farm. Insects comprise fully four-fifths of the entire animal kingdom and so affect our economic life that the success or failure of the average farmer may depend on the extent to which he is able to combat the onslaughts of these troublesome creatures. Of the 400,000 species that have been named there are to be found enemies of every crop, every tree, and every animal grown on the farm. In 1909 the chinch bug alone damaged and destroyed crops to the value of three hundred and fifty millions of dollars in the United States. An indemnity of one hundred and fifty millions is paid annually to the Hessian fly. The farm and forest products of the United States are damaged each year to the extent of a billion dollars by the ravages of these predacious insects. Though we find it hard to determine just to what extent our crops are injured, it is safely estimated that 10 per cent of all the crops of the corn-belt are sacrificed every year to insect ravages.

Insects are enormously prolific and, were the progeny of one pair allowed to reproduce without check, they would cover, in time, the entire habitable earth. The rate of propagation shown by some insects is unequaled in the whole animal world. One species of plant lice, the hop vine aphis, would, if unmolested and all the young were allowed to reach maturity, in the twelfth generation give rise to ten sextillions of individuals, a number far beyond our powers of conception. Insects are remarkably destructive because of the enormous amount of food which they must consume to grow rapidly to maturity. Many caterpillars daily eat twice their weight of leaves; one flesh feeding larva will consume in twenty-four hours two hundred times its original weight.

The farmer can successfully combat the inroads of large hosts of insects by crop rotation, proper management of farm practices, and poison sprays, and mashes, but without the assistance given by their natural enemies, he would be unable to keep down the numbers of the destructive pests to a safe limit. Chief among these natural enemies are the numerous birds which frequent the fields and buildings at various times throughout the year. The position occupied by birds among the forces of Nature is unique in one respect; their structure enables them to perform the office of a swiftly moving force of police, large bodies of which can be assembled at once to correct disturbances caused by abnormal outbreaks of plant or animal life. While not all the species of bird life feed on the small creatures of the insect world, many of our common birds are instrumental in increasing the farmer's annual income. Not all birds are the farmer's friends, however. A farmer, or orchardist, or truck gardener, has a perfect right to protect his crops from excessive bird injury. In such cases, however, one should be absolutely sure that the bird he seeks to destroy is really the guilty one and that the injury done is serious, and that the good done by the birds does not more than counteract the injury to crops.

Birds should be encouraged to stay in the community, and in the fall and winter when feed is scarce and difficult to find, feed should be scattered where the birds can find it, thus keeping the birds in the neighborhood and making permanent friends of them. Boys should be taught to protect the birds and instead of tormenting them, encourage them to build nests in favorable locations.

Not all of our common birds are beneficial in their habits, neither are any of them wholly beneficial or entirely injurious, and a careful consideration must be given before classifying the feathered folk. Of the families that stand out as decided friends of the farmer are the thrushes, including the common brown thrush, the wood thrush and veery. While any of these may feed partially on berries, small fruit, and grain, their chief articles of diet consist of insects, many of which are injurious.

The common blue bird, from earliest spring till late autumn, is busy sending forth its musical notes or searching for its food, three-fourths of which consists of insects. It preys upon cutworms, army worms,

grasshoppers, crickets, moths and a very few beneficial insects. The black and white chickadee is a great benefactor in not only consuming large numbers of insects during the summer, but more than one-half of its winter food consists of insects and their eggs. The eggs of plant lice make up one-fifth of the total feed. This represents the most important work of this bird. In fact, if any bird needs protection and winter feeding it is this little friend with its cheerful "chick-a-dee dee."

The small house wren feeds almost entirely on insects and spiders. Small bird houses with openings the exact size of a quarter (to keep out the sparrows) should be provided, and this bird will prove himself a friend indeed. The American red start, the cardinal red bird, meadow lark, crow blackbird, and downy woodpecker are among the other friends of the farmer, and feed largely on insect life and seeds of various weeds. Many threatening attacks of injurious insect hosts have been controlled by the combined efforts of these numerous birds.

One bird often unjustly condemned is the northern shrike, or common butcher bird. While a natural enemy of all small birds, his prey is mostly the worthless English sparrow. This latter bird is responsible for many ills, chief among which is the scattering of San Jose scale. The shrike also feeds on field mice and numerous insects.

Consideration should be given the owls for the important economic position they hold. While owls often kill smaller birds, they also feed on "cotton tail" rabbits, mice and even skunks. They are natural enemies of the English sparrow and should never be killed except when they make their inroads on the poultry yard.

There are other important economic feathered folk of the air, but the most important have been cited and the importance of their work given. With a keener appreciation of the services they render, the farmer will do more to prevent the unjust tormenting of the birds, robbing of their nests, and will do more to encourage their work on the farm.

Care and Management of the Brood Sow

By L. F. Powell, '21.

THE measure of success attained by those who raise hogs depends, in no small degree, upon the judicious selection of the brood sow and the care and management given her.

The brood sow should receive foods highly conducive to the production of bone, blood, tissue, and milk. The nature and amount of feed should be regulated by the condition of the brood sow, and the apparent effect on the suckling litter. Should the prospective mother be excessively fat, it is better to arrange the nature of her feeds so that a large percent be taken up by the litter; which means the feeding of high bone and muscle forming foods, with a curtailment of the fat-forming foods. On the other hand, if it is evident that the brood sow's milk supply is insufficient for the litter, feeds that are favorable for the increase of milk should be fed, and should the supply be above normal, the balance may be adjusted to slightly decrease the flow. The best way is to give an evenly balanced ration of corn, shorts, alfalfa, oats, oil meal, ashes, etc., slightly increasing the corn allowance through the suckling period. Shorts and oats should always predominate with free access to alfalfa and grasses. It is advisable to give the brood sows small amounts of tankage, blood or bone meal, or oil meal during pregnancy. Several days before the sow farrows she should be put on a ration consisting largely of slop made of equal parts of shorts, corn meal and wheat bran. This kind of a ration should be fed for several days after farrowing and the sow gradually brought back to the normal ration.

While carrying her pigs, plenty of exercise, a generous supply of medium rich food, with comfortable quarters, are indispensable to success and should not be overlooked. To allow sows to run among cattle, horses, or colts, exposes them in various ways to injuries that may cause the loss of valuable litters, especially if the sows are heavy and awkward.

Gilts should be bred when they are from ten to twelve months old and even as young

as eight months if they are well grown. It is a better practice to keep the sows that have proven themselves extra valuable breeders and sucklers, rather than experiment with young and untried gilts. A comparison of the litters from matured sows, with those of young gilts shows that the pigs from the mature sows will be more in number and larger and more vigorous than the others. The sow should be in moderate flesh when she is bred. It is best to breed the sow about the first or second week in December if a late spring litter is desired.

As farrowing time approaches, the sow should be separated from the other hogs and placed in a roomy, sunny pen, provided with some straw, out of which she will arrange her bed. If given a large amount of bedding she will make her nest too deep, forming a pit into which the pigs will roll and be crushed when she lies down. A shallow nest is much better, and in warm weather, little if any bedding need be given.

The sows and pigs should be allowed to run on pasture in the summer to furnish the bulk of the ration and to cheapen it. It will be necessary to feed some grain along with the pasture, the amount depending upon the condition of the sow. Alfalfa and red clover are our most dependable leguminous pasture plants for hogs. Blue grass is used quite extensively as a pasture for hogs but it is not so palatable as either alfalfa or red clover. Rape may be sown at different intervals and thus furnish pasture through the entire spring and early summer.

When the pigs are three weeks old, they will usually begin to eat. A small trough should be placed in a part of the pen, inaccessible to the sow, and the pigs given sweet milk three or four times a day. They should be fed about what they will clean up, but no more, increasing the quantity as they grow older, when some shelled corn, soaked in water for twenty-four hours should be given. If convenient, sour milk, corn meal mush, scalded bran with shorts, and such nourishing foods as will give them variety, should be fed. If two litters per year are to be raised, the pigs should be weaned at six weeks of age.

WHEN HEAVY CROP PRODUCTION PAYS.

(Continued from page 59)

Irrigation of market garden crops in the east certainly increased the yield per acre, but after eleven years' test the New Jersey Experiment Station concluded that with asparagus, blackberries, currants, and gooseberries, irrigation did not pay.

THE HIGH SCHOOL GIRL AND HER CLOTHES.

(Continued from page 64)

avoided and girls who might otherwise leave high school before graduation will complete their work.

Girls wisely taught will see that it is possible to express beauty and good taste whether the pocketbook be unlimited or very much restricted. "Simplicity is not plainness, stupidity nor poverty, but the very foundation of beauty and refinement. It is not money but mind which produces good taste. Without these qualities no amount of money will make a dress beautiful. A girl should create for herself a standard which is distinctive and characteristic." "The way we dress is another way of expressing our personality and of influencing our surroundings for better or worse."

It is possible for any girl to be attractive even though she may not be beautiful. Attractive clothing is modest clothing—skirts not too tight or too short, with necks that are not too low; is appropriate clothing—suitable to the occasion, to the age, and to the income; is healthful clothing—warm enough in winter and cool in summer, not too tight and always clean and neat.

Dr. Parsons says, "Does a woman dress to be attractive? or does she dress to be an attraction?" Let every girl ask herself this question.

E. P. Lewis, '20, is teaching horticulture at Illinois University.

NOTES.

The members of the Junior Pomology class of Purdue University took their annual inspection trip to Bedford, Ind., during the week beginning October 4th. The University owns a large apple orchard at Bedford and is conducting numerous experiments there. The students were given an opportunity to pick, grade and pack apples and also to study the work being carried on by the Experiment Station. The trip was under the supervision of Prof. O. G. Anderson.

THE POTATO WART DISEASE.

(Continued from page 57)

This is done by the control, by the authorities who are in Washington, of inspections of all shipments of nursery stock. In this way it is held in check.

No method of eradication in the field has been found as yet. The organisms are known to exist in the soil for many years; so the process of starving it out would be a very slow one.

There is no known way of protection by use of spray or seed treatment; so the seed must not be planted in infected soil.

There has been considerable done to secure immune varieties in the British Isles, but as yet there are none which prove entirely satisfactory. However, some show a remarkable amount of resistance.

The fungus outlives the processes of digestion in animals; so it is possible for it to be distributed in the manure. All waste and peelings should be boiled before being thrown out or fed to stock of any kind. These precautions, however, are only for the infected regions, and do not affect us in the corn-belt states, but in case the disease is introduced here then these and many more precautions will have to be taken. In case a suspicious looking specimen is found it should be immediately reported to local, state or government authorities who can give expert advice on the matter. Only co-operation will hold it in check. In some cases it has been found to actually exist, in the same soil where it was introduced, for six to eight years.

HOME ECONOMICS CLASSES IN INDIANA.

(Continued from page 53)

home and the community, it has been necessary to change the type of work and develop it along project lines.

There was no stronger organization during the war period than that of the Home Economics classes, and it was through these organizations in many counties that it was possible to choose local leaders and perfect the war work organizations. After the war the classes seemed to realize their worth as community organizations, and have backed all kinds of movements that had to do with the betterment of community life.

Last year the programs prepared for study by these classes were planned with the idea of intensive study along four special lines: health, food, textiles, and household management. The topics for study were chosen so that they could easily be altered to meet the local needs. No organization can do effective work until it can see some need for work, and can interpret help in terms of local conditions. The November program of the Roachdale Home Economics Club, Putnam county, shows how these classes are working:

November.

The Woman's Responsibility for Health in the Home and in the Community—Miss Ella Walsh.

Essential Precautions in the Care of Contagious Diseases—Mrs. George Irwin.

The Care of a Convalescent Patient—Miss Lola Wilson.

Discussion: Have We Adequate Means of Caring for the Sick in this County?—Mrs. Leo Smith, leader.

Roll Call—Proven Home Remedies.

Demonstration—Food for the Sick—Miss Edna Barnard, Mrs. Charles Crosby.

Interesting community projects have been carried on by the classes. They have been very enthusiastic in their support of Girls' Club Work. Local leaders have been secured through their co-operation, outings, have been chaperoned and financial aid for prizes has been given. The Hendricks county classes have formed a County Home Economics Association and have come to be one of the strongest organizations in the county. Special mention should be made of their co-operation with the home demonstration agent and the Girls' Clubs. These girls' clubs and the home demonstration agent plan each year to end up their summer's work with an outing. This year they went to Camp Short, a beautiful camping ground near Clayton, and spent several days. Thirty-nine clubs were represented with an attendance of 175 members. The girls did their own cooking and slept in the cottages or under the tents or trees. The Home Economics Clubs gave loyal support to the girls and insisted that all communities visit the camp on Thursday, which was visiting day, and the girls were proud to report 500 visitors coming from all parts of the county. The program for the day was:

5:30 a. m. Bugle.
6:00 a. m. Tooth brush drill.
6:10 a. m. Calisthenics.

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12:00 m. Dinner.
1:30 p. m. Business.
2:00 p. m. Band concert by Plainfield Boys' Band.
2:30 p. m. Stunts by various clubs.
6:00 p. m. Supper.
9:00 p. m. Bugle for bed.
9:30 p. m. Lights out.

A county Junior Home Economics Club was formed and with the Senior County Home Economics organization as an inspiration, surely these girls will accomplish great things through the coming year.

The school lunch work in many communities has been made possible through their efforts. Nutrition tests that have meant much toward opening the eyes of the public to the need for better selection of food for school children have been supported by Home Economics classes. In short, many classes have made themselves into "Improvement Societies," for their small towns and communities.

The most interesting feature of the whole scheme is that the membership of the entire organization is open to all women who will work, and help make the influence of the class felt throughout the community. It is one of the few organizations that is open to the entire community and has for its chief aim helps for home making and development of community life. With this in mind, it means much to a community to boast the existence of such an organization, for more and more we are coming to realize with Francis B. Willard that "The mission of the ideal woman is to make the whole world home-like."

The Ralston-Nolan land tax bill now being advocated proposes a tax of one per cent on land values in excess of $10,000. No consideration is made for the present taxes paid by the farmers, and the bill is designed to raise $1,000,000,000 at the farmers' expense.

ALUMNI NOTES.

C. O. Cromer, '06, formerly of the soils and crops department at Purdue, is farming near Danville, Ind.

P. E. Jones, '20, is farming near London, Ohio.

H. L. Jones, '20, is farming near Pine Village, Ind.

N. T. Crane, '19, is associate editor of "Farm Life," at Spencer, Ind.

S. D. Sims, '20, is farming near Elnora, Ind.

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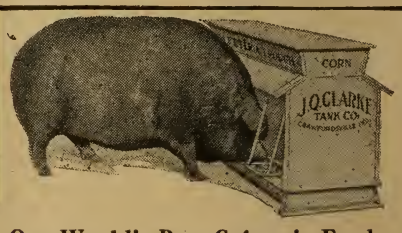

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UNDERWEAR

SECURING DISEASE-FREE SEED CORN BY THE IMPROVED RAG DOLL METHOD.

(Continued from page 49)

many of them returned several times at different stages of the work.

At the most it can only be said that the corn disease testing by the Modified Rag Doll Method is still in the experimental stage, although the tester described in this paper is thoroughly reliable and can be recommended to every corn grower. Arrangements are being made to follow up the laboratory work with field checks in all parts of the county during the summer of 1920. These check plots ought to furnish much valuable data that will be helpful in further study of our corn problems.

As a class we are very proud of Purdue Bulletin No. 236. This bulletin contains photographs of our class at work and gives detailed information concerning the "Modified Rag Doll and Germinator Box."

The proposal of Chas. A. Lyman, secretary of the National Board of Farm Organization at Washington, that each local farm organization donate $10 for membership in a proposed national union of farm loan associations, is not meeting with general favor among farmers.

Mr. G. W. Cochran, a graduate of Michigan Agricultural College, has been engaged to take the place left open in the Horticultural Department by the resignation of Mr Mason. Mr. Cochran was an instructor at Penn. State last year, where he obtained his Master's degree.

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is a **wonder.**
It keeps the **water warm** in winter, **cool** in summer.
Can move your water supply to any part of the farm.

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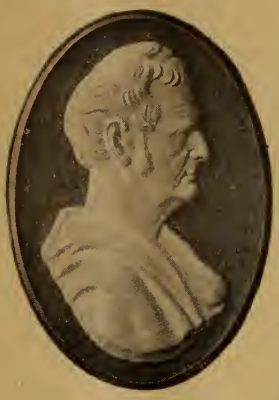

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For cheese and butter making on the farm as well as in largest creameries and cheese factories, Hansen's preparations are standard. They are **pure, concentrated, and simple to use.**

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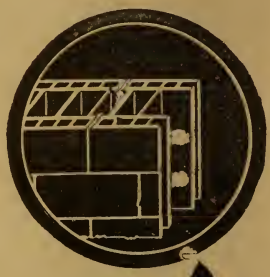

Section of Natco Wall showing still air spaces.

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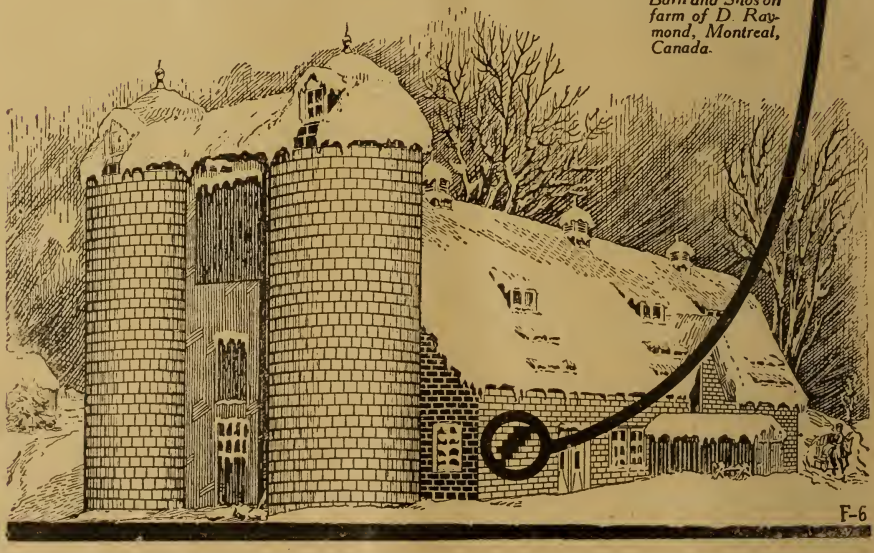
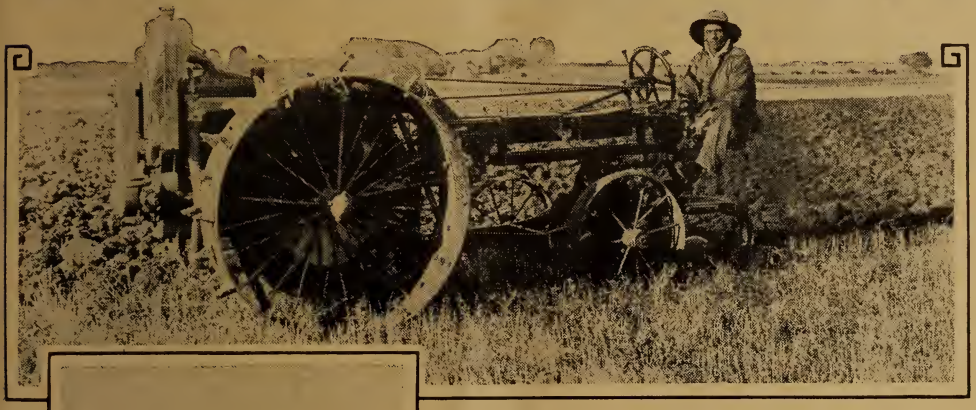


F-6

MOLINE

The Universal Farm Power Plant

WINS AGAIN



LAST year Ben Davis, five times champion with horse-drawn plows, won the Wheatland Plowing Match in owners' class with a Moline Tractor.

Again this year the same team wins!

Ben Davis won sitting on the seat of his plow, where he could watch the work and make instant adjustments to meet varying soil conditions.

Mr. Davis is a great plowman, and the Moline a great farm unit. They made an unbeatable combination.

The Moline is now offered as a 3-2 Plow outfit.

3 Plows for ordinary conditions which prevail in most sections of the country.

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It is the correct farm power plant, doing all belt and field work, including cultivation, with one man.

If desired you can use the "Drag behind" or horse drawn implements you now have with the Moline Tractor the same as with other types of tractors.

The Moline is unique in the tractor field—made so by our patent protection.

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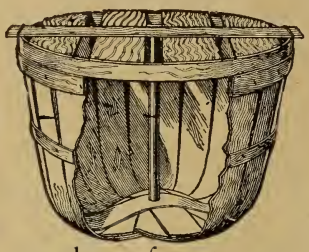

This standard bushel shipping container is equally adapted to every fruit or vegetable crop. Its great strength positively prevents injury from crushing. Its web is constructed so as to permit plenty of ventilation, making it an ideal package for storage purposes. Covers fasten without nails. Retailers prefer Universal Packages for display purposes, for their neat, clean appearance makes ready sale at top prices. Over 10,000,000 were used last year.

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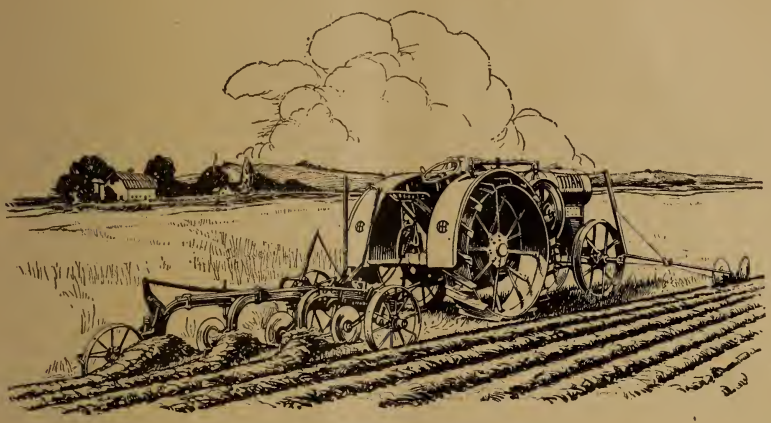

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Behind P. & O. Little Genius Tractor Plows you will always find clean, smooth furrows of uniform depth and width, with weeds and trash tucked snugly under the freshly-turned blanket of soil.

Bottoms that scour under adverse conditions; quick detachable shares that enable you to replace dull shares with sharp ones in a hurry; a positive power lift that gives a high level clearance—plows are raised high on three wheels, ridding bottoms of all trash; sure penetration, the whole weight of the plow being utilized to force the bottoms into the soil—these are some of the features that account for P. & O. Little Genius satisfaction and clean furrows.

Aside from P. & O. Little Genius tractor plows, which are made in 2-, 3-, and 4-furrow sizes, the P. & O. line contains Mogul power-lift tractor plows ranging from 4- to 8-furrow sizes, tractor grub breaker, and riding and walking horse plows of many types—a plow for every soil and for every plowing purpose.

Two famous reputations—**P. & O.** and **International Harvester**—stand back of every P. & O. plow and are assurance of efficient, satisfactory service from these plows and dependable after-sale service at all times, in any emergency.

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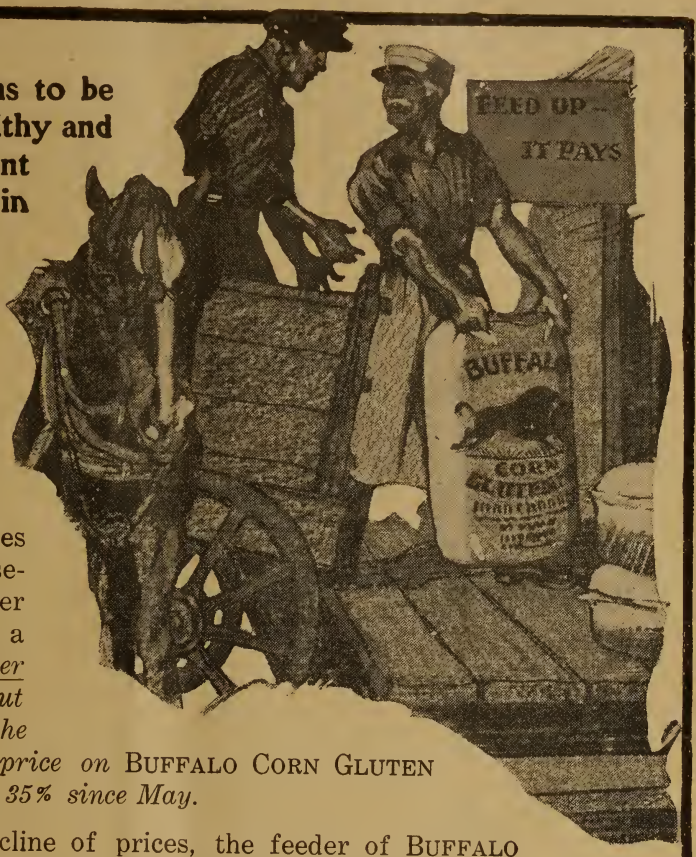
AGENTS WANTED IN UNOCCUPIED TERRITORY.
We Solicit Your Patronage.

The country seems to be experiencing a healthy and general readjustment of prices. Prices in many lines seem definitely to be coming down and the purchasing power of the dollar to be going up.



However, milk prices for October held closely to the September price, which was at a high level. The *October milk price was about 30% higher than the May price. Our price on* BUFFALO CORN GLUTEN FEED *declined some 35% since May.*

In this general decline of prices, the feeder of BUFFALO CORN GLUTEN FEED has had a distinct advantage in the shape of our guarantees against decline in our price.

With these guarantees on BUFFALO CORN GLUTEN FEED, the dealer has been able to *rewrite his price* from time to time, and keep current with the declines; and the *dairy farmer,* who has bought this feed with the same *protection, is able to mark down his costs in the same way.*

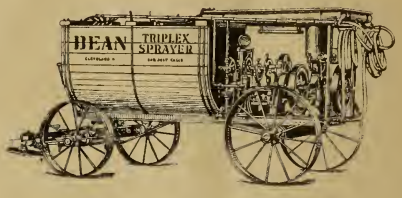
A grain ration with a liberal proportion of BUFFALO CORN GLUTEN FEED can be made up—*on account of these guarantees*—at a much lower cost than with other concentrated feeds.

FEED UP!
to reduce your cost of production

Corn Products Refining Co.
New York — *Manufacturers of* BUFFALO CORN GLUTEN FEED — Chicago

Successful Growers Know from Experience that

BEAN SPRAYERS ARE BEST



That has been proven in the largest orchards under all conditions.

Features that make long life and economy found only on the Bean, account for their great success.

No matter how large or how small a sprayer you need, we have it.

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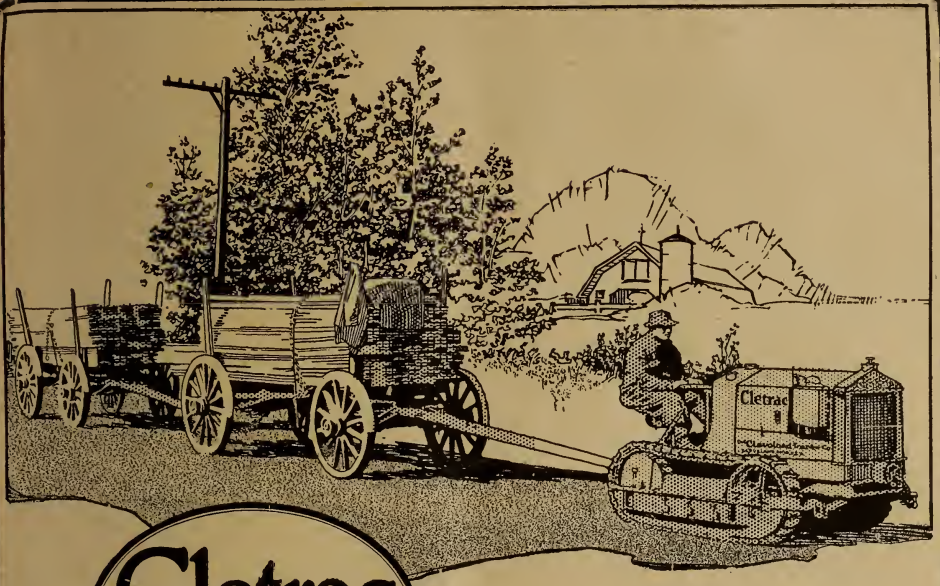

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EASY ON A TRACK THE CLETRAC WAY

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DECEMBER, 1920 VOL. 15 No. 3

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More profits from every hog—that's what you get. Start feeding Pig Chow now. Buy it from your dealers or write—

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IN building the Case farm tractor there are three important factors that we have considered:—the work a tractor is expected to do; designing and building the tractor so that it will perform continuously with the greatest possible efficiency and economy; prompt service to the purchaser when needed.

The J. I. Case Threshing Machine Company built its first gas tractor in 1892 and its first thresher in 1842—has seventy-nine years of agricultural machinery manufacturing experience behind it today. The Case engineering and service organizations have been built on this solid foundation.

Case Kerosene Tractors are **designed right, built right,** and **sold right**—three good reasons why they are the right tractors for power farmers to buy.

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Our Trade Mark

To avoid confusion, the J. I. Case Threshing Machine Company desires to have it known that it is not now and never has been interested in, or in any way connected or affiliated with the J. I. Case Plow Works, or the Wallis Tractor Company, or the J. I. Case Plow Works Company.

J. I. Case Threshing Machine Company
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CASE
TRADE MARKS REG U S PAT OFF AND IN FOREIGN COUNTRIES
KEROSENE TRACTORS

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Do *you* put in *there?*

FEED, yes. But—
WHAT KIND is it?

At the fairs and dairy shows, many of the most successful dairymen tell us they get more dollars' worth of milk out of a dollar's worth of BUFFALO CORN GLUTEN FEED, fed mixed with wheat bran or millfeed, oats, etc., than any feed they know of.

They probably never had anybody offer a reason *why* BUFFALO CORN GLUTEN FEED makes milk the way it does. They did not care WHY so much, as long as they got the milk. But the *very high digestibility*, in large measure, *accounts for it.*

See that there is plenty of BUFFALO CORN GLUTEN FEED mixture in the feed trough in front of your cows—and you will understand *why* BUFFALO CORN GLUTEN FEED is so well thought of on thousands of real dairy farms.

FEED UP! Your dealer should have BUFFALO CORN GLUTEN FEED. If he does not, write us for literature and sample, giving us his name and address.

Corn Products Refining Co.

New York — MANUFACTURERS OF BUFFALO CORN GLUTEN FEED — Chicago

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Entered as second class mail matter December 4, 1906, at the Post Office, LaFayette, Ind., under the Act of Congress of March 3, 1879.

Subscription Price One Dollar Per Year. **Advertising rates sent on application.**

The Corridor house during the Flower Show.

The Purdue Agriculturist

VOLUME XIV DECEMBER, 1920 NUMBER 3

A Western Bean Beetle Threatens to Invade the Central and Southern States

By Geo. M. List, '09,

Chief Deputy, Department of Entomology,
Colorado Agricultural College.

WITHIN the last few months another little known insect, and one that is commonly called a "lady" beetle, has gained a national reputation. This time it has not been through being imported from a foreign country, but rather from being transported from one section of our own country to another. Heretofore the Mexican bean beetle, or the spotted bean beetle (Epilachna corrupta Muls) as it is commonly called in the west, has been confined to a rather limited territory within the semi-arid section of the west and it has not created much interest among entomologists and agriculturalists except in the sections infested. The infested territory has been confined largely to Colorado, Arizona and New Mexico, especially along the eastern foothills of the Rocky Mountain range. Here it has been a very serious pest to garden beans and has been considered a much more serious pest to the bean crop than the Colorado potato beetle, which has taken its name from our state, has been to the potato crop. This insect is considered a native of Mexico, but has been in Colorado at least since the earliest entomological data was collected. The territory infested has been limited largely to the foothill region and even since the more outlying sections have been placed under cultivation the spread has not been rapid.

The recent outbreak that has brought this insect to the attention of many people has been in the State of Alabama, where it has recently been discovered to infest at least twelve counties. In its new habitat it seems to be changing its food habits to some extent, and is feeding upon cow peas and other closely related crops, as well as upon garden beans. As all of these crops are of such importance to the south, it is creating a great deal of excitement. The alarm with which this new outbreak is looked upon by the entomologists and agriculturalists of the south is indicated by the fact that the State Legislature of Alabama is being asked for an appropriation of $250,000 and an equal sum is being asked from the United States Department of Agriculture to take up extermination work.

If the insect should prove as injurious to the leguminous crops of the south that it is reported as feeding upon, as it has to the garden beans of Colorado, it would be a serious menace to the entire agricultural system of the cotton belt, and there is reason to believe the beetle would find conditions favorable as far north as Ohio and Indiana.

Apparently the pest was introduced into Alabama in shipments of alfalfa hay or of beans from Arizona, New Mexico or Colorado, and to prevent so far as possible further introductions into new territory, the Federal Horticultural Board of the United States Department of Agriculture has called for a quarantine hearing which will doubtless result in the promulgation of a quarantine order regulating the shipment of produce from Alabama as well as from the infested area in the west.

The insect belongs to the lady beetle family and is one of only two species of this family that feed upon vegetation. The others are all predacious and are considered very valuable friends to mankind because of their destruction of so many injurious insects. The beetle is about a quarter of an inch long, hemispherical in shape, and of a dull yellowish-brown color, with eight black spots on each wing cover. It winters over

in the adult stage under rubbish and grassy places about the fields and gardens and in Colorado appears upon the beans early in June or July. After the adult feeds for a few days, it begins depositing its yellowish-brown eggs in clusters on the under surface of the bean leaves. These egg masses very much resemble those of other common lady beetles which are familiar to most people. The eggs hatch into a pale yellow spiney larva which feeds mostly on the under surface of the foliage but may attack the flowers and pods of the beans when more fully developed. When full grown they are sometimes more than a quarter of an inch in length, light yellow in color with dark tips to the numerous spines over the body. When mature they attach themselves to the under surface of the leaves and transform into adults. In Colorado this generation of adults appears during August and September, and may feed upon late crops of beans and do serious damage. During some seasons there is a partial second generation but usually this is not large enough to do a great deal of damage. Farther south a larger per cent of a second generation is reported, and it is very likely that in the warm regions of the cotton belt it may prove to be an insect of several generations.

The insect is a ravenous feeder in both the adult and larval stages. Small bean plants may be destroyed early in the spring by the adults issuing from hibernation and the generation of the adults that appear in August and September often do serious damage to crops of late beans. The larvae feed over a period of about three weeks and those that hatch from one cluster of eggs, which will range from twenty to sixty, will often eat enough to destroy an entire hill of beans containing several plants. The larvae feed principally upon the under surface of the leaves, eating off the epidermis, and leaving only the skeleton. The adults may eat holes in the leaves. Both forms will attack blossoms and small pods, often entirely eating them up or causing them to drop. The large pods may often be destroyed.

Means of Control.

The Colorado Agricultural Experiment Station has been carrying on investigations for a number of years to determine the best means of control, and a bulletin on the insect and its control will be issued within the next few weeks. The pest has been very difficult to handle, and most literature reports that satisfactory control has not been obtained. This has largely been due to the susceptibility of the bean plants to injury from the use of the arsenical sprays. Many of the common insecticides generally used upon orchard and garden crops cannot be safely used on the beans, and this coupled with the fact that the insect is not as easily poisoned as some insects has made the work very discouraging. However, during the last four seasons fair results have been obtained with some of the better grades of arsenical insecticides upon the market. But even with these some injury in the way of burning with the arsenic has developed. Probably the best results have been obtained by using arsenite of zinc, one pound to forty gallons of water. Arsenate of lead used at the same rate has controlled the insect fairly well, but considerable injury has resulted in a number of instances.

The outbreak in the south may be more serious on account of the fact that it is attacking many field crops that cannot well be sprayed and also due to the fact that the arsenical insecticides are very likely to be much more injurious to the tender bean crops in a more humid section than they are in the dry climate of Colorado. For this reason, and on account of the seriousness of the insect, the people of the south have reason to be alarmed over the infestation. While the extermination of insects is a very rare thing where they have become established in a section suitable for their development, it is hoped that it may be accomplished in this case.

TIME TO GET IN.

There has never been a better time to replace scrub stock with pure-breds. The market is right for the buyer, whether he wants to try a pure-bred sire for the first time, or whether he wants to gather up foundation herd.

A farmer might make money this winter feeding 70 cent corn to hogs if he bought both the feed and the hogs. The fact remains, however, that the farmer raised his corn with high-priced labor and carried over high-priced stock to raise and feed.

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A Jersey Home in the West

By John L. Wann.

WHEN one traverses in thought our great country searching for a pleasant place to locate a future home, how many of us take into consideration a number of the western states? Are we not prone to think them as a vastly wooded section, or great dry plains, with occasional open ranges here and there? This is quite true, but often the mistake has been in not considering that red blooded Americans fairly abound in those regions, and that some of the most beautiful dairy farms in the country lie nestled in those pine covered mountains and fertile river valleys.

The beautiful country home of Mr. Graves at Waikiki.

In the spring of 1918 the writer had the good fortune to be in the state of Washington and had the pleasure of seeing this country in which are located many good dairy farms. One of the farms visited was four miles north of Spokane, Washington. A well kept asphalt road led to it. North along this highway one is confronted on all sides with low mountains set with dwarfed pines. It does not look like a farming district as we know such in the corn belt, but suddenly as you go along the scenery changes. You look into the valley below and there, behold! a Paradise, neither too large nor yet too small, which seems to have been intended for the country home of some merchant prince.

In such a place is located the Waikiki farm where Mr. Jay P. Graves practices the breeding of Jerseys. Mr. Graves was born on a farm in Illinois and lived there until he completed his education at Carthage College. After college the lure of a commercial life held him for ten years in the mercantile and hardware business. At the same time he was owner of a farm. The western fever seizing him, he moved to Spokane, Washington, where he bought the present place known as Waikiki. This beautiful farm has been in development about eighteen years. Shorthorns which were brought from Illinois were first tried on the farm, but since they proved to be not adaptable to the climate, the owner engaged in the breeding of Jerseys. Though engrossed in the affairs of business, Mr. Graves has not lost the love of his farm, nor neglected its wonderful surroundings. For example, he has been interested in railways, and is now interested in several smelting and mining companies. His

natural instinct, however, turns him to the farm and to livestock. As he expressed it when gazing over that fertile valley crowned by his beautiful dwelling: "I take to Jerseys like some men take to dogs." This is true because in developing them he finds his recreation. He started his herd with only twelve cows and a sire, and has increased yearly to the present number of more than two hundred choice pure-breds.

The site of this farm is almost entirely surrounded by low mountains, leaving just room enough at either end for the shining Little Spokane River to flow through and water the fertile fields. Aside from the magnificent country home, I think I was most impressed with the fact that nature must have been pleased when man discovered this valley and said, "It is the proper spot for furthering the development of that intelligent animal, the Jersey."

There are many acres of pasture, myriads of evergreens for shade, the river, fertile soil, and what is one of the greatest provisions of all, the latent power locked up in the farm's twenty-four living springs. From two of these springs are developed about one hundred electrical horsepower. One of the springs has an eighty-foot head and the other one hundred twenty. Both springs are utilized to develop power from the same generator. This electrical power is used for lighting the buildings and grounds, running the cutting plant at silo filling time, for grinding corn and oats, for cutting alfalfa, and for pumping water to the owner's residence upon the hill. All of the farm houses are connected with the springs and the flow made possible by gravity.

Mr. Graves has found that early frosts make it difficult to raise corn successfully every year for silage and in place of this he grows the Mammoth Russian sunflower. It has proved successful and yields a much larger tonnage than corn. His cows eat it equally as well.

Pilot's Model with a 3-year-old record of 16076.3 lbs. of milk and 746.86 lbs. of butter fat.

One of the best animals upon this farm is Pilot's Model. She has been undefeated wherever shown, and every year has produced a living calf. One of the herd sires is her calf and a fine young herd is coming on as a result of these two pure-bred animals. As a three-year-old, Pilot's Model produced 16,076.3 pounds of milk and 746.86 pounds of butterfat in the Class AA and thus won a gold medal. She is now a retest as a mature cow and is making over 60 pounds of fat per month in the eighth month. Her grandsire is Eminent 69631, who sold at auction for $10,000.

Another valuable individual is the old herd bull, Count's Foxy Lad of Waikiki. His

dam, Eminent's Foxy Belle, produced 14,920 pounds of milk and 816 pounds of butterfat as a senior three-year-old, a fact which makes her third in standing in her class in America. Pilot's Rockland Beauty is sired by Eminent's Pilot who is sire of Eminent's Foxy Belle, and of Eminent's Nelly Sultan who produced 890 pounds of butterfat.

Somehow I felt a thrill of pride as I approached those gentle creatures in the lot and they allowed me to stroke their silky hide. Of course they are gentle because of much handling, yet just as a hunter believes that his dog is a judge of human kind, a dairyman loves to think that the good cow knows a husbandman.

Mr. Graves' future plans are progressive in nature. He hopes to achieve development to the end that he may carry two hundred or more milking cows instead of one hundred twenty, to have a yearly market of from one hundred to two hundred cows, and to devise a plan whereby, in addition to their salary, a sharing of profits from animals raised and sold may be had by the farm employees. I shall always cherish the memory of my visit to this Jersey home in the west, and if any of my readers are fortunate enough to take a tour through the great northwestern country they should not miss the opportunity of seeing Waikiki farm and of meeting this genial owner.

What the Farmers' Federation Should Mean to the Farmer

By Ralph Montgomery.

Second prize article in the Agriculturist Prize Essay Contest.

AT last the farmers of the United States have come to the wise conclusion that if they are to make any progress they must do it through co-operation. In pioneer days the farmers did not need to co-operate. Since he produced almost all his food, and provided his own clothing, he was self-sustaining, but with the specialization of the present day, he is becoming more and more dependent on others.

At the present time the farmers pay high prices for labor and must compete with organized capital and labor. One man against a union can do nothing, a few men can do but little, but with all farmers cooperating they will succeed in getting their just rights. Steadily but surely the farmers have begun to realize that as much can be accomplished with brains as with brawn.

The old order is fast disappearing and the farmers have formed a Federation of Farm Bureaus. They are realizing that the business end and not the manual part needs most attention. In the past, several small organizations have been tried.

The Grange gave fine results to be such a small organization; the Corn Belt Live Stock Producers' Association is a decided success at present; the Fruit Growers' Association idea is one of the best achievements of the west. What these small organizations have done in a small way the Farmers' Federation hopes to do in a large way.

The purpose of the Federation is the advancement of agriculture. This can be done by solving questions relative to rural betterment and agricultural science. A careful study of the methods of production and distribution of farm products should reveal a system of greater economy and efficiency in handling them. The Federation hopes to encourage better co-operation among farmers in buying and selling products and necessary commodities. The past summer has been a trying one for the farmers. Only part of the time could he get cars to ship his produce. The lack of cars at the right time has been a great financial loss to him. With this plan, and the efforts of the men who are in charge of the federation, things are expected to run more smoothly in the future. The Federation is also hoping to secure wise and helpful legislation on matters pertaining to agriculture and betterment of rural conditions.

The National Federation is only in its infancy as regards achievements, but it has been instrumental in securing wise legislation in regard to the Federal agricultural appropriations, affecting especially the county agent work. Also prompt action

prevented the spread of the European corn borer which threatened to menace the corn crop of the middle west last year. The National Federation has been helping to regulate the meat packing industry which was securing a monopoly on food stuffs.

In this state much has been accomplished. First, the appointment of a live stock committee which made an improvement in stock yard conditions; forced installation of automatic scales which reduce the chance for graft. Stock cars were secured which seemed unavailable before; wool was pooled in several counties and handling charges were greatly reduced. It also prevented the quarantine of Indiana because of the dreaded "Takeall" disease. Without the Federation, Indiana would have been quarantined and the result would have been a heavy loss to wheat growers. Co-operative buying of twine, fertilizer, feeds and lumber has resulted in a large saving. They have also engineered wise legislation on several occasions. The Federation issues monthly a state paper reporting its progress.

Although the movement has just started it has proved a decided sucecss. The National Federation has been in existence only a few months and already there are twenty-eight states who have affiliated with it, and more are joining. One very important matter was the voting of the national budget of two hundred thousand dollars to cover expenses for the fiscal year. Over seven hundred thousand members at present belong to the National Federation. The legislative, the live stock, and other committees will act with well paid officers.

The Federation will probably handle economic subjects appertaining to farm products, the same as business concerns are compelled to do. It will have its own traffic department; its own legal department; its own collection department, and if the farm bureau is properly organized, it will have its councils and representatives in every important market.

The bureau of markets undoubtedly will get down to business along these lines as soon as it gets organized. The purchase and operation by farming interests of the stock-yards in central markets is not an improbability.

The future of the Farmers' Federation is bright. They have made a brilliant beginning, and with every farmer giving his support, it will, and must be a success.

It is either, "United we stand," or "Divided we fall."

Conducting the Pure-bred Hog Sale

By C. R. Beard '22

THE man who is successful in the pure-bred hog business must be a good breeder, a good feeder, and a good salesman. He selects his foundation stock from the best blood lines and the best individuals of the breed. He selects herd boars and sows with popular blood lines, but always insists on individuals of merit. He is a constructive breeder—not a jobber—and his aim is, "to better the best." He usually finds it desirable to have a diversity of blood lines for his auction sales, and for this purpose he buys a few good sows bred to noted boars outside his own herd, and develops their litters.

Select only the best animals for the sale, because it never pays to sell and inferior animal for breeding purposes. All culls should be fattened and sent to market. Put only a few boars in the sale, because boar sales often get slow if you try to sell too many. Ten are enough boars to put in a sale of fifty or sixty head of hogs. Spring pigs as a rule yield a greater profit on the investment than yearlings or older hogs, but for the sake of variety, however, it is a good plan to sell a few yearling boars and gilts.

Advertising is necessary to acquaint the public with your herd. Showing prize-winning stock at the fairs is excellent advertising. Also, a sign on the barn, giving the name of the breeder, the name of his farm, and the breed of hogs is a cheap but effective advertisement. The use of attractive letterheads and business cards lends dignity to your business. A small insert run continuously in the local and breed papers is a good means of keeping your name before the public.

Increase the amount of advertising as the time of the sale approaches. Use the breed papers, the general farm papers, and the local newspapers. Distribute a few posters and sale bills at stores and meeting places. Do not underestimate the value of the sale catalogue. Prepare the copy in a neat and attractive form, typewritten if possible, and get it to the press in plenty of time to get the catalogues at least ten days before the sale, which will allow plenty of time for mailing.

The writing of the catalogue is an art in itself. The important things are to make it attractive without being gaudy, to avoid crowding, to write pedigrees correctly, and to use footnotes with discretion. A few good pictures of good hogs give a pleasing effect.

Good sale prospects.

It is customary to furnish crates for shipment, and they should be made before the sale. Of course you never know how many hogs you are going to ship, but you will have to estimate as closely as you can and make plenty of crates. Make the crates long enough, but not too wide.

A large, roomy, well lighted, well heated sale pavilion is a valuable asset. Each individual breeder should plan the pavilion according to his own needs. If a man stays in the pure-bred business very long he can scarcely afford to do without a sale pavilion, because it saves the expense and inconvenience of renting a tent for each sale, and can be used during the year for a hog house.

The final fitting of the hogs for the sale, although less important than the previous feeding and management, should not be overlooked. The feet may be trimmed several weeks before the auction. The ears and tail may be clipped several days before the sale, but spring pigs are seldom clipped. The hogs may be washed the day before the sale and kept in clean quarters that night. Oiling is not done until the day of the auction. Do not use too much oil.

The actual selling comes last and is the climax of the year's preparation. It is good policy to use local auctioneers, and also auctioneers that make a specialty of selling your particular breed of hogs. Make out a selling list before starting the auction. Start the sale with a good animal, but not the best one, because buyers are usually timid about bidding on the first animal. Then keep the best hogs coming all the time, taking care to sell the best one in a litter first.

Remember that honesty is the only policy that pays. Make a good guarantee on your hogs, and back up that guarantee, even though it does hurt to do it. Never make any fake sales to boost prices, but sell every animal on its merits. Remember that satisfied customers are your best advertisement, and endeavor to give each customer a square deal.

Getting Winter Eggs From Pullets

By C. B. Bouton, '21.

ONE thing of primary importance which a poultry raiser must consider if he expects to be successful in obtaining winter eggs from his pullets is proper feed and method of feeding. A pullet, it must be remembered, is an immature individual, and as such is called upon to perform two tasks; namely, that of completing her growth and at the same time producing eggs.

The same food elements are required to produce body growth as are needed to build an egg. We know this because an egg contains all those elements which are capable of producing a living chick when incubated at the body temperature of the hen for twenty-one days.

Now the question presents itself as to what are the materials of which an egg is composed, and what available feeds contain these materials. The constituents of an egg are protein found chiefly as albumens in the white of the egg, fats which are present only in the yolk, and ash or mineral matter out of which the shell of the egg is composed. Sixty-five per cent of the egg by weight is water. The distribution of the weight of an egg is as follows:

Shell, 11%.
Yolk, 32%.
White, 57%.

We must therefore use feeds which are high in protein, fat and ash building materials.

Let us take corn for our first feed. This grain is rich in corn starch, a carbohydrate, which is convertible into fat as it contains the same chemical elements as fat; i. e., carbon, hydrogen and oxygen. The germ is rich in corn oil and also contains a small amount of protein. This grain when digested in the fowl's body will furnish heat and energy for maintenance and the fats and ash will be used for the making of yolk or the depositing of fat around the muscular tissue and abdominal walls.

What is true of corn is to a certain degree true of the other grains. The great bulk of the contents of all the different grains is composed of carbohydrates.

Now as muscular tissue is composed largely of water, protein and ash, it is necessary to consider the sources from which it is possible to secure a protein supplement; i. e., a feed which will furnish the protein part of the ration. It is also necessary to know which kind of protein is most desirable for the production of growth, that which is obtained from vegetable sources or that which is obtained from animal sources. Many experiments have proved the animal protein to be much more available from a nutrition standpoint. To supply this protein, tankage, meat scrap or skim milk can be used. The skim milk may be fed either sweet or sour. Although these products contain ash, they do not contain it in sufficient quantity to supply the amount necessary for the formation of the egg shell; therefore, oyster shell must be kept before the birds at all times. A sharp mica grit is also necessary to furnish a suitable grinding surface.

Approximately eighty per cent of the food which a pullet consumes when in full laying condition is used by the body for maintenance and the remaining twenty per cent is used to produce eggs. If a pullet does not receive sufficient feed to perform both functions properly she will meet the requiremetns for maintenance first. The bird should receive all she will eat of the right kinds of feed. A pullet will eat one-fourth to one-third of a pound of feed per day. A laying ration consists of two parts of scratch grains to one part of mash. The Poultry Department of Purdue University recommends the feeding of the following ingredients in a laying ration:

Laying mash	Scratch Grains
5 lbs. of bran	10 lbs. of corn
5 lbs. shorts	10 lbs. of wheat
3½ lbs. of meat scraps	5 lbs. of oats
13½ lbs. of mash to	25 lbs. of grain

The general practice among most good feeders is to scatter a light sprinkling of grain, about one-third of the amount fed in a day, in a deep litter of straw in the morning, forcing the birds to exercise vigorously to get the feed. The dry mash hoppers are as a rule open so that the fowls may have access to the mash at any time during the

day. Some feed a wet mash at noon, but this practice seems to have a tendency to cause the birds to become sluggish and inactive during the early part of the afternoon. In the evening the scratch grain should be scattered in the litter and the birds should be given all they will clean up.

In addition to a sufficient quantity of the right kinds of feed, plenty of clean drinking water is an absolute necessity for egg production, as it is directly correlated with the physical well being of the bird. During the cold, damp weather of the fall and winter months it is a good practice to use some good disinfectant in the drinking water. A stock solution of copper sulphate can be prepared in the proportion of one ounce of crystals to ten gallons of water. When used in this proportion it will serve effectively to prevent the appearance or spread of colds and roup which make their first appearance in the flock at this season of the year.

A good flock of pullets given plenty of feed of the right kind, together with plenty of clean water and housed properly should give an egg production far above the average which is common in the state at the present time.

Annual Flower Show

The Annual Purdue Flower Show was held this year on the afternoons of November sixth and seventh. The visitors numbered somewhere in the thousands, and the general opinion seemed to be that this was the best show that has ever been put on here.

Some fine specimens of "mums."

As usual the exhibit was held in the Marstellar greenhouse by the students of Horticulture. Prof. W. E. Lommel was in charge of arranging the various flowers and was responsible for the pleasing effects produced. Over forty varieties of chrysanthemums of all sizes, shapes and colors were grouped on the benches. Many of these varieties were new ones, received this year from the University of Illinois.

Besides chrysanthemums, there were exhibits of cut flowers, ferns, palms and other decorative plants.

Christmas Sweets

By Eunice E. Teal '21

WHAT can bring more real Christmas spirit into our homes than the making of Christmas cakes and candies? What child or "grown up" would not be delighted with a tempting box of Christmas sweets? Not only does it furnish occasion for a wonderfully good time, but restrains the eating of cheap sweets which are often quite harmful.

Candy.

No doubt we have all, at some time or other, been disappointed because our candy was not as smooth and creamy as we had expected it to be, and wondered what made it coarse and grainy. Yet, how easy it is to avoid this, because the whole secret of success lies in understanding a few of the principles involved in the cooking of ordinary sugar.

When sugar is boiled a small part of it is changed to a non-crystalline form, called invert sugar, which crystallizes with great difficulty and if at all in very small crystals, and it is this invert sugar which gives the candy its smooth, creamy texture and prevents its crystallizing into large, coarse grains.

The addition of acids, such as cream of tartar, vinegar and lemon juice increase the amount of invert sugar formed but the acid may be omitted entirely if the requisite amount of non-crystalline sugar is added in the form of corn syrup, molasses, honey or even brown sugar which has a small amount of invert sugar left in.

In candies, which contain no crystals at all, as taffy, butterscotch and caramels, more acid or non-crystalline sugar is added than in cream candies, for if too much invert sugar is present the candy will remain a sticky, gummy mass and refuse to cream. Since the amount is so important it is quite necessary that all amounts and directions given in recipes be carefully followed.

Stirring or agitating candy, while it is cooking or still hot, causes the crystals to be larger, so never stir it after the sugar is dissolved and it has begun to boil. Crystals which fall into the candy while it is boiling or cooking, if not dissolved, cause larger crystals to form about them, thus making the candy grainy, so it is best to keep the crystals washed down from the sides of the pan and thus avoid this danger.

It is also very important that the candy be cooked to the proper stage or degree of hardness, the length of time depending on the amount of water used, and the rapidity with which it is cooked.

The common and very good method of testing its consistency is by dropping a small portion into cold water. But by far the most accurate method is to use a candy or ordinary chemical thermometer which may be purchased or ordered at any drug store. They come graduated in either Fahrenheit or Centigrade scales. In using, the bulb should be entirely immersed in the boiling syrup but not touching the bottom of the vessel.

Fondant, although hardest of all candies to make, is the foundation for so many of our Christmas candies and keeps so well that it should receive our first attention. It is best to cook not more than two cups of sugar at one time and have everything ready before beginning to cook the candy.

Cooked Fondant.

2 cups sugar
⅛ teaspoon cream of tartar
¾ cup boiling water.

Add cream of tartar to sugar then boiling water. Put over fire and stir constantly until it commences to boil. Do not splash the syrup. Remove the spoon and do not stir again after it boils. Just before the syrup begins to boil, wipe down the sides of the pan by means of a swab, made by wrapping a narrow strip of clean muslin around the tines of a fork and tying securely. Put a cover over the pan and cook several minutes. The condensing steam will rinse down the sides of the pan. Remove the cover and cook slowly, but keep the crystals washed down. Do not jar or move the kettle while the syrup is cooking. To test, use a tooth pick; wet it in ice water, dip it into the boiling syrup and then back into the water. If the syrup remaining on the tooth pick can be rolled into a soft ball, it is time to instantly stop the boiling. If using a thermometer, cook to 113½ degrees to 114 degrees C. or 261 degrees F. Have ready a platter slightly greased and ice

cold. Without shaking the pan, pour out the candy, beginning at one end and letting it all pour out by the time it reaches the other end. It must cool quickly! Never allow the last of the syrup to drip out over what has been poured out already. Never scrape out the kettle, as these scrapings will cause the candy to be coarse and grainy instead of soft and smooth. Do not move the candy while it is cooking. When it is cool, but not until then, use a scraper or wooden paddle and commence by turning the syrup over toward the center. Turn it over and over in this way. It will finally form a hard ball which can no longer be worked. With clean hands knead this as you would bread dough until it is soft and smooth.

If the syrup cooks too long and hardens into a grainy mass, do not despair, but add some rich cream, a little at a time, and work with the hands till creamy.

Place the candy in a crock or glass jar and cover with oiled paper, or it may be kept several months if kept wrapped in a damp towel. Let stand at least twenty-four hours, after which it may be colored and flavored. Wintergreen candy may be colored a delicate pink by using fruit paste made from dried cranberry pulp and powdered sugar. Grated orange rind made into a pulp or egg yolk may color the orange and lemon candy. A paste made of spinach pulp and powdered sugar will tint the almond a delicate green.

Add the coloring on the end of a tooth pick to a small piece of the fondant and add flavoring with a medicine dropper. Work with the hands till all the same color, then work the small piece into a larger piece. Make out into bon-bons, or a variety of shapes with nut and fruit centers or decorated with halves of nuts and pieces of candied fruit. Cocoanut balls may be made by working grated cocoanut into the fondant and then rolled into balls. Nut ball may be made, using chopped nuts. Dates are delicious when the stones are removed and the centers filled with cocoanut or nut fondant.

Dipping in Chocolate.

For variety some of the candies may be coated. Let stand long enough to harden before beginning to dip them. Grate one pound of dipping chocolate. Baker's Dot Dipping Chocolate may be purchased at most any grocery or confectionery store. When the water in the lower part of the boiler is scalding, put the chocolate into the upper part and stir with a wooden spoon until the chocolate begins to melt. Remove boiler from stove and stir until the chocolate melts. Be careful not to let the water under the chocolate boil, as it will make the chocolate streaky when on the candy. Allow the chocolate to cool till of right consistency for dipping. Experience will teach this. Work in a cool place.

For dipping use a small wire dipper made from a fine piece of wire. Make a small loop at one end of the wire and fasten securely, then bend the handle at an angle so it can be dipped into the chocolate more easily.

Place a bon-bon on the loop with the top side down. Dip into the chocolate until it is all covered. Lift out and quickly drop the candy down into waxed paper so that the top side will be up. The marks made by the wire will close in and leave the entire surface coated. Do not disturb until the chocolate is firm which will take some time. If coating is too thin, dip a second time in the same way. They may be decorated with halves of nut meats or piece of candied fruit pressed into place before the chocolate is firm.

Nuts, almonds, peanuts, Brazilian nuts, walnuts and pecans may be coated with chocolate in this way. Or they may be dipped into fondant which has been melted in the top part of a double boiler. Do not let the water boil in the lower part of the double boiler, and stir the fondant until it is melted. After the nuts are coated with the fondant, dip into chocolate. Candied cherries, strips of candied pineapple, figs, stuffed dates, caramels, fudge and marshmallows may also be dipped.

Peppermint Drops.

Put ½ recipe of fondant in upper part of double boiler. Add 3 drops oil of peppermint. Stir the fondant occasionally with a wooden spoon until melted, well mixed, and smooth, but do not let water in lower part boil. Remove to a cool place quickly and pour a teaspoonful from the tip of a spoon onto waxed paper. If carefully done the drops will be perfectly round. Do not disturb until hard. Wintergreen, almond and maple drops may be made the same way.

Fruits, which do not contain sugar in

such a concentrated form as candy, are much better for children and may take the place of part of the candy in the form of familiar friends.

Christmas Friends.

Santa Claus' head is a marshmallow. His cap is half of one. His eyes and mouth are cloves and his whiskers soft tissue paper cut in fine strips and fastened on by the clove for the mouth. His body is a fig with currants as buttons pressed onto the coat. The head is fastened to the body by a tooth pick on each side running through the center of the fig. The ends of the tooth pick, which stick up from the top of the head, are used to fasten on the cap. Each arm is a date fastened on by a bent tooth pick, the shortest end being pressed into the fig coat. Each leg is a date held in place by a tooth pick pressed as far into the fig as possible, leaving a short end for the feet. The gloves and shoes are made of whole unskinned almonds. Make a hole for the tooth pick by piercing the almond with a pin.

The Brownies may be made in much the same way. The head is a marshmallow dipped partly into hot chocolate to make the hair. The eyes, mouth, and nose may be made by using a tooth pick dipped into the chocolate. The cap is a fig. The arms and legs are made of currants or small raisins pushed onto a tooth pick or small wire. The boots are almonds but the hands are salted peanuts.

Cakes.

Purdue Fruit Cake.

⅝ cup sugar
½ cup butter
½ cup flour
2 eggs
½ cup water
½ lb. raisins
½ lb. currants
½ teaspoon soda
½ teaspoon cinnamon
½ teaspoon cloves
½ teaspoon nutmeg
½ teaspoon allspice
½ lb. citron
¼ lb. figs
¼ lb. English walnut meats

Cream butter and sugar together. Add eggs well beaten, then soda dissolved in water alternately with ¾ cup flour and spices sifted. Then add chopped citron, raisins, nuts and currants after flouring raisins and currants with remaining ¼ cup flour. Mix well, put in buttered pans and cover with paraffin paper. Steam three hours and dry in oven. This cake should be made several days before Christmas and kept in a cool, dry place.

Use a good recipe for white cake and bake in two layers. Put together with:

Seven Minute Frosting.

2 cups sugar
½ cup boiling water
2 egg whites
2 cups marshmallows cut in small pieces
1 cup English walnuts
½ cup candied cherries cut in pieces
½ cup candied citron cut in pieces.

Add boiling water to the sugar and place in top part of double boiler and let stand until the sugar dissolves. To this very quickly add whites of two eggs unbeaten, and begin beating at once with a Dover egg beater, continue beating seven minutes; remove from fire and let cool slightly.

Place one layer of cake firmly and spread with a thick coat of the filling. Place over this, carefully, a layer of the cut marshmallows and then spread another thin layer of the frosting. On this sprinkle the nuts, cherries and citron an another thin layer of frosting. Place upon this the other layer of cake. On top and sides spread just the white frosting.

The following filling and decoration may be used with any dainty loaf cake.

Heavy White Sauce.

1 cup cream
2 tablespoons butter
4 tablespoons corn starch
1 teaspoon vanilla

Rub butter into corn starch till smooth and pasty. Add to heated cream. Allow to thicken then cool till luke warm. Add 1 cup of marshmallows and 1 cup nuts. Stir in well.

Cut the cake into two equal layers and spread all of the sauce on the lower half. Place the other half on top of this and cover top and sides with plain Seven Minute Frosting.

Decoration.

Completely wash out all the salt and milk from a full cup of butter, then fill perfectly full of powdered sugar. Work it in until it is quite stiff. Divide into two parts. To one portion add a bit of red coloring and to the other a little green. Make the colors delicate. Have ready two pastry tubes and into each place material and make design on top of cake. Holly leaves may be outlined with the green and berries made of the pink paste.

The Pruning of Apple Trees

ALTHOUGH it makes no difference in what part of the dormant period pruning is done, yet there is one rule which is safe to follow. That is to get at it as soon as possible and get it over with. Otherwise it is apt to be delayed too long and the rush of spring work cause it to be neglected for another year. These occasional nice days should be taken advantage of to get an unpleasant job off hands.

Pruning has for years been accepted as one of the common and necessary practices of orchard management. However, a large number of growers, if they had been asked why they pruned as they did would have replied that it was necessary if a crop was desired and besides the farm papers and agricultural bulletins said to do it. Only recently have experiments been carried out so that definite recommendations can be given, and even these can only give the effects of pruning on the first few years of growth and earliness of bearing and not on the total fruit production for the entire life of the tree. At the present time some of the state experiment stations are still recommending the old style of severe annual pruning and heading back, although several different investigators have proven definitely the disadvantages of this method.

Pruning is the art of modifying the shape or size of the tree in order to secure more fruit, more regularly and of better quality.

Briefly the objects of pruning are as follows:

1. To properly form the top and keep the tree well balanced.

Trees like this need very little pruning—just a little thinning out.

2. To let the requisite amount of sunlight into all parts of the tree.

3. To remove the branches which are dead or diseased, which have a tendency to crowd, or which would form weak crotches.

4. To make picking easier and spraying more effective.

5. To thin the fruit.

6. To lower and renew the tops of the trees.

The method of pruning an apple tree varies from year to year as it increases in

size and comes into bearing. While in the nursery row the young tree grew up in its natural form and at the end of its growing season had established a certain balance between its root system and its top. That is, the roots were sufficient to supply the top with the required amount of moisture and mineral matter, while the top had developed enough to manufacture plant food sufficient for the further growth of the plant. Then when the young tree is dug from the nursery row there is a certain unavoidable loss of roots. This throws the tree out of balance and if it is put out without being pruned, in the case of drouth, the roots will not be able to furnish enough moisture to any of the buds and death or a feeble start are liable to result. The remedy for this condition is pruning at time of setting out, but even then great care must be exercised in order not to overdo the matter. About twenty per cent of the top should be removed, partly by thinning out and partly by heading back. The branches which are to form a part of the framework of the tree should be clipped back only lightly.

The system of training which has been growing most rapidly in favor in the middle west is the modified central leader type. By this method the central leader is allowed to grow for a few years, to a height of ten or twelve feet and is then cut out, providing plenty of room for the entrance of sunlight while not exposing any of the main limbs to sunscald. The framework is usually made up of a number of scaffold limbs which are not as large as those of the open head type but greater in number and spaced around the trunk so as to provide a maximum of strength. When the young tree, which is to be trained in this manner, is set out the central leader may be headed back a little but it must remain longer than the side branches since it is to be dominant for a few years.

After the initial pruning at the time of setting out, it is safe to follow the principle of taking out as little wood as it is possible to do and still obtain a tree of the desired form, without crossed branches or weak crotches. The nutrition of the plant will depend on the amount of foliage area, and the buds near the tips of the shoots, being strongest, will produce the largest leaves in greatest abundance. With these facts in mind it is easy to account for the fact that trees pruned very lightly or thinned out rather than headed back produce more fruiting wood as well as more total growth. Any pruning from the fact that it reduces stored food material as well as potential leaf area, will undoubtedly restrict optimum root development. This in turn will limit the growth of trunk and branches and a general dwarfing will result. It is true that when a limb is cut off vegetative growth is stimulated and several new shoots are sent out which grow up very quickly. However, the total amount of growth is not as great as it would have been if no cut had been made. The new branches are crowded and apt to be weak and more pruning is necessary next year to keep the top from becoming too bushy and full of small, slender, non-fruit-bearing twigs.

While these things are true with regard to young trees, old trees which have been bearing a few years present a somewhat different problem. When old trees are pruned the vigor is increased and there is a tendency for new and stronger spurs to be formed which set fruit more often than the old distorted ones. The desirability of this increased vigor varies, however, with the individual tree. Where the roots furnish a large supply of moisture and nitrogen there is apt to be a superabundance of vegetative growth and lack of bearing fruit spurs. Pruning would only aggravate this condition and produce a dense, bushy top. But for the tree that is stunted through lack of moisture and mineral matter, pruning is the method of inducing new growth and the renewal of the fruiting wood.

All depends, however, on how this pruning is done. When a limb is cut off there is an increased growth which comes near to the place where the cut was made. This shows that the practice of thinning out should be followed rather than that of heading back, and that the cuts should be distributed over the entire tree. One of the main objects to be obtained in pruning the mature tree is the admission of sunlight to the spurs set low down on the limbs and in the center of the tree. Thinning out will admit light and make possible the bearing of large, well colored fruit throughout the tree, while heading back makes the top dense and keeps the production of fruit limited to the outer extremeties of the limbs.

MORE PROFIT FROM POULTRY.

MANY farmers and poultrymen are overlooking an opportunity to add to the returns derived from the sale of their surplus poultry. That such is a fact is shown by the poor condition in which much of the poultry reaches the packing plants. Many packing plants have feeding stations where these birds are fattened for a short period before disposing of them. The gain in weight pays the packer well for his feed and labor. Part of this profit could be secured by the producers of this poultry if they would only fatten it for a short time before marketing it. Of course the farmer who has only a small number of birds to sell cannot go into this as extensively as does the packer, but even where only a small number of birds are to be marketed, the gain put on during a short fattening period will return a good profit over the cost of feed and labor.

The birds which are to be fattened may be confined in a small colony house, shed, or a stall in the barn. This will restrict their exercise and they will put on flesh more rapidly than if they are allowed to run on range. The birds should be fed for from one to three weeks, depending on their condition at the beginning of the feeding period. A good fattening ration consists of two parts of corn feed meal, one part of ground oats, and one part of shorts, this grain to be moistened with eight parts of skim milk or buttermilk and fed as a mash. If milk is not available, add one-half part of tankage to the above mentioned grains and moisten with eight parts of water. Feed this mash in troughs twice daily, morning and evening. Make the two feeds as nearly twelve hours apart as possible. The first few feeds should be light, gradually increasing the amount until the birds are on full feed at the beginning of the third day, when they can be given all that they will clean up readily in about thirty minutes. Care should be taken not to feed too much as this will cause the birds to go off feed. At each feed give enough so that the birds' appetites will be almost but not completely satisfied. Then they will have an appetite for the next feed. The troughs should be removed after each feed and cleaned so as to insure proper sanitary conditions.

This method of fattening may be used to good advantage not only for adding weight to the birds which are to be marketed, but as it greatly improves the quality of the flesh, it may be used as a means of producing better meat for the family table.

EXTENSION WORKERS' CONFERENCE.

The county agents and extension workers of Indiana held their twenty-third annual conference at Purdue November 3-5. The meetings were exceedingly well attended and unusual interest manifested. Prof. Christie and other station men were the chief speakers Wednesday. For the night session Dean Coulter of Purdue spoke on "The Farmer and His Community," while President Stone presented the "Needs of Purdue." Dean Skinner opened the Thursday session with a discussion of the livestock situation in Indiana. Prof. Woodbury, former director of the Experiment Station, but now connected with the National Canners' Association, followed with a discussion of "Some Problems of the Producer." C. E. Gunnels, the assistant secretary of the National Farm Bureau Federation, spoke very ably on the Cooperation of Agricultural Forces. Miss Edna White, head of the Merrill Palmer school of Detroit, was the chief speaker before the women's session. Her talk on "Problems of the Rural Home" was very instructive and inspiring. Thursday night a banquet was held at the West Side M. E. Church, the principal speaker being Mr. L. J. Tabermaster, of the Ohio State Grange.

Friday morning's program consisted of addresses by Clarence Henry, of Hebron, Ohio, and W. W. Bonner, of Greensburg, Ind. Mr. Henry, formerly assistant county agent leader of Indiana and now a farmer in Ohio, advocated the improvement of rural homes and agriculture through community cooperation. Mr. Bonner, chairman of the agricultural committee of the Indiana Bankers' Association, urged that the city and country get together and try to understand each others problems.

The conference closed with a business meeting of the County Agents' Association. O. E. Ackerson, of Crawfordsville, was elected president; Calvin Perdue, of Frankfort, vice-president, and R. G. East, of Shelbyville, was re-elected secretary-treasurer.

THE PURDUE AGRICULTURIST

Published monthly during the school year, by Agricultural Students of Purdue University, LaFayette, Indiana.

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The purpose of THE PURDUE AGRICULTURIST is to disseminate the latest scientific knowledge concerning Agriculture and Home Economics, to incite the young people of Indiana to a greater desire for training in Agriculture and in the industrial pursuits, to publish matters of interest concerning the Purdue School of Agriculture and the Purdue Experiment Station, and to afford opportunity to the students for training in Agricultural journalism.

CHRISTMAS.

The Christmas season of happiness, festivity and abounding good cheer is at hand. Heralded by all the signs of earth and sky, winter has come, and nature, the model mother, has all her children warmly clad in readiness for his coming. Not only the birds and the woodfolk, but also man's friends, the domestic animals, are garbed in their heaviest coats. The sun at midday hangs low in the southern sky and his feeble rays register little effect upon the snowdrifts that cover the fields and block the highways. Nature's stage is set in perfect array for the observance of Christmas.

On a bleak December day three hundred years ago the sturdy Pilgrim fathers landed on the New England shore, bringing with them high ideals of liberty and democracy. The stern environment which they encountered here was calculated to develop and accentuate the cardinal virtues with which they were endowed. Their physical and moral courage is a matter of common knowledge, while the record of their achievements stands as an eternal monument to the qualities of real manhood which they possessed. Their wisdom is attested by the fact that their dream of self-government has been realized on this continent and has since been carried back across the Atlantic to bless the oppressed of Europe. As children and heirs of the Pilgrims we have every reason to feel proud as well as fortunate.

But not only are we debtors to the past, but we have a debt of gratitude to pay for present blessings. War no longer clouds our horizon, the political atmosphere is clearing, and economic conditions are rapidly returning to the normal. Furthermore, nature has liberally rewarded man's labor with bountiful crops of field, orchard and garden. Let us then approach this Christmas season with a deep sense of humility and gratitude. Let us give freely and gladly of our abundance to help the poor and unfortunate. And may we as true sons of our honored Pilgrim fathers show our appreciation to Almighty God for present blessings, by scattering broadcast the Christmas spirit of helpfulness and good cheer.

PURDUE STUDENTS PLEDGE $326,335.

This is the answer that the Purdue students give to the question: do we want a Purdue Union?—an answer that is a challenge to the Alumni of the University to prove that their Purdue means just as much to them as Purdue today does to its student body. At no more appropriate time than Armistice Day could the student body pledge its support to the Union, and no more fitting way could it pay tribute to the sixty-eight Purdue men who died during the war and the four thousand who served. A gigantic memorial meeting in which all ex-service men, the R. O. T. C., the student body, and friends participated, was the testimonial of

respect to these men, and pledges made in two mass meetings—one in Fowler Hall, and one in the Gymnasium—will help perpetuate their memory by bringing to the future student bodies a monument which will unite them in one common society and permit them to measure the service these men rendered in terms of the actual service that the Union renders to them. Fifteen per cent of the sons and daughters of Purdue, the present members of the University, have pledged thirty-two per cent of the amount required to build the Purdue Union, and it now remains for the eighty-five per cent who are out of school to raise the forty-four per cent that is yet to be subscribed.

THE JUDGING TEAM.

Since the second week of September a squad of eight men and for a time twice that number have been in training for the stock judging team that will represent Purdue at the International Live Stock Judging Contest. This preparation has consisted in placing from one to three classes of beef cattle, horses, sheep or hogs at the university farm each evening, and later giving reasons for the placing. Week end trips have been made to the farms of Jesse Andrew, Warren T. McCray, George Dix, Paul Silverthorn, W. W. Rose, and Illinois and Ohio State University Farms, as well as to other farms around Thorntown, Rossville, Rockfield, Roachdale, and Boswell. Professor W. W. Smith, assisted by the animal husbandry men in the University and Extension Departments has coached the team. By placing as high man in either the horse or cattle contests, the individual is awarded a medal, and the winning team receives a bronze trophy for its university. The man in the Purdue team placing highest in the former contest is awarded the Palmer Edgerton, '07, medal, while high man in the beef cattle contest is awarded the John T. Montgomery, '14, medal. The competing men meet all of their expenses in preparation for and attendance at the International. However, the large amount of experience gained is invaluable, and making a judging team is one of the biggest things that a man can do during his senior year.

As a business man a farmer should have suitable business records.

At Ames, medals which are the gifts of prominent interested alumni, are awarded to men from each class in school who are winners in their separate contests. At California State Agricultural College, $250 in cash prizes is divided among the high men in each contest. Many other schools give medals in recognition for work done. Plans may eventually be worked out at Purdue that will aid the men in meeting the expense of the preparation and the trip to the International. However that may be, the compensation in extensive and intensive training which exceeds that which can be obtained in any class work is the real return for time and energy expended.

WINTER BEEF FEEDING 1920-21.

With the enormous corn crop of the past season on hand, and with the price for the product on the open market steadily on the decline, many farmers have begun to look forward toward the feed-lot as a means of disposing of the surplus. Although last year was disastrous for some feeders, it will not deter the professional, who stays with the game always. In addition to these men, however, it is likely that a number of new men will make their first attempt during the coming winter. To these men a reminder of some of the vital points to be observed is in order. Too much emphasis cannot be placed on condition. Experimental data have proved that if the price of two feeders is the same, the one having the better condition will usually make the most money in the feed-lot. Constitution and thrift must not be overlooked. Capacity to consume food is also a point to consider. In buying a carload lot uniformity should be a prime factor. When sold on the market the lot having a uniform appearance will outsell a similar group which lacks this quality. Attention to these and kindred matters will mean more dollars in the pocket of the feeder next spring when they are sold.

In 1919 the pork exports of this country amounted to 24 per cent of the total production, while beef exports amounted to but 2.5 per cent of the production.

Be sure those young lambs get proper attention.

A Clean Sweep—

On the Erie Home Convenience Special which left Hammond, Indiana, September 29th, making about 150 stops enroute to finish of trip November 2nd, at Suffern, New York

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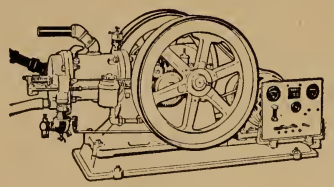
This trip was made under the auspices of Purdue University, Ohio State University, Pennsylvania State College and Cornell University, and College lecturers and demonstrators were in charge of the train.

PIONEER PLANT



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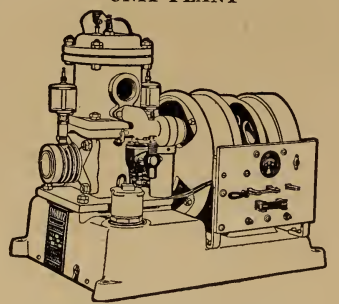

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Alumni and Local

THE PURDUE UNION.

We, faculty and alumni, are engaged in the actual personal campaign for the greatest Purdue enterprise yet attempted. And in a measure we are getting results. This is proven by the fact that to date approximately $300,000 of the total $1,000,000 has been realized. This has been given by alumni, but the students themselves feel more keenly than anyone, being on the scene personally, the actual need for this organization which will make possible such a building.

To enter with heart into this great enterprise, a thorough understanding of the entire matter is necessary.

For the university the Union will: 1. Develop a true university spirit. 2. Stimulate the social side of education. 3. Improve the standard of social activities among the students. 4. Afford a place of entertainment for guests of the university.

For the students the Union will: 1 Provide wholesome recreation in attractive surroundings. 2. Develop personality of the students. 3. Broaden the vision and develop the community spirit in the student. 4. Effect an equality of opportunity for all students heretofore impossible.

For the alumni the Union will: 1. Mean comfortable headquarters in West Lafayette. 2. Supply the tie that binds more closely the alumni with the university. 3. Intensify the spirit of loyalty and helpfulness of alumni to the university.

Purdue is not like endowment schools where the alumni expect to help from time to time. The Union drive is one opportunity to help which can not be overlooked.

Arguments have been advanced by some few alumni when asked for donations, that they could possibly derive no benefit from such an organization or such a building. Possibly not so much direct benefit, but who among us that have received degrees from Purdue or who have attended for any time will stand by and willingly see the institution which has so fitted us for a life work take a secondary place among like colleges.

Just as soon as alumni realize that Purdue is an institution in which they all have a common share and not a place where they visited for a time and then severed all connections, just that soon will Purdue take that place which is rightfully hers.

PURDUE SPIRIT AND FOOTBALL.

Every one had the highest possible hopes of the Purdue football team this year, which was fitting and proper. Our season on the face of it does not look like a wonderful success, but wait—all conference schools had wonderfully strong teams this year and many veterans with years of experience. Purdue's team this year is a good looking bunch and, oh how they do fight. But they lack the experience of many of the conference elevens. Let us review for a moment our three defeats of this season, namely, the Chicago, Ohio State and Notre Dame games. Chicago with every break in their favor and playing on Stagg field amassed 20-0 score, but they were loud in their praise of a game fighting bunch that will never say die. Ohio State, the probable champions of the conference this season, were only able to beat us 17-0 on their home field. When you consider that such teams as Michigan, Chicago and Wisconsin have fallen before their attack also, we do not look pitiful. Then came those Irish with beyond a doubt the best team in the entire country as proven by their defeat of the strong Army team. They administered a 28-0 defeat, but what have they done to other antagonists this season?

All through the season the spirit of cooperation of the student body has been something to be admired. A large per cent of the student body went to Chicago and yelled and rooted until the final whistle. Likewise at Notre Dame, and those who were financially unable and who stayed at home were on Stuart field getting wire returns and cheering their "heads off."

Now would it not be more fitting and more in accordance with the time-tried Purdue spirit for some of the alumni who are saying, "There is something wrong somewhere," to come to Lafayette on November 20, and see us in action and then go back and send us some promising football material next season?

We think that it would.

BASKET BALL.

Coach Ward Lambert has issued his call for basket tossers, and the prospects for this year look exceptionally bright. Captain Don White is back in person as is Haigis, a last year's substitute forward, and Chafee bids fair to make the team.

Last year's freshman team turned out men who will certainly make up for the losing of three such stars as Church, Campbell and Tilson. These men are Treat, Morgan, Masters, Kreigbaum, Bausman, Holwerda, Kerr and Jackson.

With a team such as this and an exceptionally good schedule, watch the Boilermakers go.

Basket Ball Schedule 1920-21.

Dec. 17—Butler at LaFayette.
Dec. 20—Notre Dame at LaFayette.
Jan. 4—Butler at Indianapolis, Ind.
Jan. 11—Wabash at LaFayette.
Jan. 15—Northwestern at LaFayette.
Jan. 22—Ohio State at Columbus, Ohio.
Jan. 28—Indiana at LaFayette.
Jan. 31—Michigan at LaFayette.
Feb. 5—Illinois at LaFayette.
Feb. 8—Wabash at Crawfordsville, Ind.
Feb. 12—Ohio State at LaFayette.
Feb. 19—Iowa at Iowa City.
Feb. 21 or 22—Illinois at Urbana.
Feb. 26—Northwestern at Evanston.
Feb. 28—Michigan at Ann Arbor, Mich.
March 3—Indiana at Bloomington.
March 5—Iowa at LaFayette.

BIG ARMISTICE DAY CELEBRATION.

Purdue did homage on November 11 to her 68 loyal sons who made the supreme sacrifice during the World War. All students, ex-service men, and the one army nurse in shcool, Miss Bernice Lauman, '22, paraded. Pres. W. E. Stone and Dean Stanley Coulter delivered the addresses, while Major R. G. Kirkwood conducted the special military tribute to the heroes.

Prof. W. W. Fitzpatrick has recently been appointed for field service by the American Guernsey Cattle Club. Prof. Karl B. Musser and Prof. E. L. Westover are the other two men working in the same sort of positions.

Peter Lux, Corn King, talked to the Agricultural Society Tuesday evening, Nov. 9.

PROF. LATTA ARRANGES HUGE FARMERS' INSTITUTE PLAN.

Professor Latta, a farmers' institute specialist for the Extension Department of the University, has arranged a program of 382 farmers' meetings to be held throughout the state for which 36 speakers have been engaged. They will begin November 16 and continue until February 8. Specialists from Purdue are among these speakers. They are Miss Lella R. Gaddis, C. T. Gregory, H. W. Gregory, Dr. L. C. Kigin, W. A. Ostrander, Miss Inez Richardson, and R. L. Thomas.

L. E. Huffman, '18, has recently been selected as assistant county agent leader and will assume his new duties December 1. After graduation Mr. Huffman spent one summer in the central and southern states making a study of plant diseases for the bureau of plant industry. Following this he spent a year in post graduate work at the University of Wisconsin. He was then selected as county agent of Jay county, where he served until appointed assistant county agent leader.

THE FARMERS' SHORT COURSE.

Have you planned to attend the Farmers' Short Course, January 10-14? The entire week will be crowded full of instruction and inspiration so that the time and money spent here will prove profitable investments. Some features of the Short Course are:

1. State Corn Show.
2. Apple Show.
3. Annual meeting of the Indiana Corn Growers' Association.
4. Annual meeting of the Indiana State Dairy Association.
5. Meetings of the Shorthorn, Angus and Hereford Breed Associations.
6. Meeting of the Indiana Home Economics Association.

A great many people attend the Short Course regularly year after year, feeling that they can't afford to miss it. The lectures, demonstrations and exhibits are being made intensely practical this year and every farmer who has never attended should make a special effort to do so this time. Start the New Year right by attending the Farmers' Short Course.

Danger of Fashion in Pedigreed Live Stock

By J. F. Beldon, '21

IN consideration of the high prices of live stock at the present time and especially of pedigreed live stock, the value of the pedigree should be given careful consideration. A pedigree is a record of the ancestry of an animal. It is based on the old accepted law that "Like begets like or the likeness of some ancestry."

A pedigree has no value in itself, but if tabulated it serves the thoroughly practicable and useful purpose of enabling one readily to investigate the character of the ancestry. It is merely a means to an end and that end is our effort to arrive at a fair judgment as to the probability of a given animal reproducing in its progeny the qualities and characteristics which are sought. The average buyer does not use due diligence in looking into the individual characteristics of the progenitors of animals whose purchase is contemplated.

It is not always possible personally to examine the sire and dam. It is even more difficult to get a close line upon the conformation of the grandsires and granddams, but it would be possible in most cases to secure photographs or written descriptions which would be of service in making up a judgment as to valuations. In no case should the ancient reputation of individuals be permitted to exert due influence. It is mainly a question of what certain blood is producing now, today, rather than the production of animals four generations back and further.

When we speak of a fashionable pedigree we mean one that shows somewhere in it, either close to the latest descendant or farther back, the name of some individual that has a great record, either show, track, or production record, depending on the kind of live stock. The more times the high record individual or individuals appear in the pedigree the more valuable it becomes.

But some of the high record individuals are also very poor in conformation and are far from the standard desired. The animals represented in a pedigree do not cut much of a figure, below the first few named at the top, in influencing the heredity of the particular animal to which the pedigree belongs. Pedigree crazes have arisen, and values have become attached to scraps of paper where the animals attached to the paper were prized accordingly. Men with means and time to devote to the fascinating subject, began to breed pedigrees instead of cattle. Since they possessed wealth they were quite ready to spend money, in the spirit of sportsmanship, in popularizing pedigrees or family names and tribes. Here then was a strong factor in the evolution of Shorthorn family fads.

Another factor was the prominence given the female line of breeding in the printed form of pedigree. As an illustration:

Allerston Rosarian		Sire, Allerston Abbot
Dam, Rosewood 83rd		by Stonyton Seal
2d	Rosewood 82nd	by Golden Prince
3d	Rosewood 77th	by Early Morning
4d	Rosewood 76th	by Waverly
5d	Rosewood 54th	by Cap-a-pie
6d	Rosewood 23rd	by Dk. of Edinburgh
7d	Rosewood 13th	by Privy Seal
8d	Rosewood 9th	by Mario
9d	Rosewood 6th	by Lord of the Isles
10d	Rosewood 5th	by Grand Forth
11d	Rosewood 2nd	by Moonshade
12d	Rosewood 1st	by Southstar
13d	Rosewood	by Dauphin
14d	Selina	by Stratton

The new breeder and one not versed in heredity is almost sure upon reading this pedigree to assume that Allerston Rosarian coming through a long line of Rosewoods must be filled with the blood which founded the tribe; overlooking the fact that the Rosewoods towards the end of the list count practically not at all in comparison with the two or three sires named at the top in determining the kind of animal Allerston Rosarian is likely to be. So far as his 13th dam is concerned, Allertson Rosarian will show no more Rosewood blood than Berkshire hog blood. Through that long line of Rosewoods, each by a different sire, the heredity of the original family has undergone such changes that Allerston Rosarian is not likely to exhibit any recognizable trace of it. Why should he be designated as a Rosewood? Again these animals are so far back that no trace as to the conformation can be found. They may have looked worse than scrubs.

Not long ago I was looking at a certain individual the purchase price of which was said to have been $30,000. He was weak in several points of conformation; although not old, he was low in the back, lacked the large, deep, and wide middle that a bull should have, and was very rough. He was seldom exhibited, but his pedigree was distributed freely. It showed the most popular lines of breeding and seemingly some of the best mating that could be made. It was plain that without the fashionable pedigree back of him his selling value would be much less and he would seldom be heard of.

Until more is known concerning animal heredity the wise course is to select breeding animals with reference to their individual make up, breed type and character, limiting consideration of their pedigree to their close ancestors whose names appear in them. To go beyond the third or fourth generation in a pedigree is hardly necessary.

Unusual performance either under the test of speed, dairy production, or in the show ring causes a very eager demand for animals so related or others nearly related as to have promise of similar excellence. The strain or family becomes fashionable and justly so because the popularity is based on true merit. But when unworthy animals are accepted it deteriorates the fashion into dispute because of the devastating effects of the fad on the breed.

Improving Rural Schools by Standardization

By R. O. Cole, '21.

ONE of the greatest movements toward the improvement of rural schools today is that of standardization. It ranks well alongside that of consolidation, and when we consider that according to the most recent statistical report of the bureau of education there are 195,400 one room rural schools in the United States, we can readily see that both standardization and consolidation are badly needed. However, we cannot hope to consolidate all of these schools, as conditions of transportation, population and many other things will not permit. We can, however, improve them by standardization and this is being done in twenty-seven states of the United States at the present time.

In these states there are certain requirements which a school must meet in order to become a standardized school. These requirements are usually printed in the form of a score card and include such things as grounds, buildings, material and instructional equipment, sanitation, administration and community activities. According to the legal requirements as set by the State Boards of Education the most stress is placed upon the physical conditions, such as grounds, buildings, sanitation, water supply, heating and ventilation, and less upon teachers, organization, community activities, etc.

These items that have been mentioned as necessary for standardization may be assigned certain numerical values which would in a measure indicate their importance. Since, however, it has been found that not all of the states have adopted these numerical valuations, it would naturally be concluded that they are not absolutely necessary to the success of the standardization movement. On the other hand, there are several good reasons why they should be used, and in commenting on this Miss Helen J. Dunaway, a county superintendent in Oklahoma, has said: "I believe numerical values are necessary in order to get the best results from standardization. The average man on a rural school board will consent to have the floor oiled if it adds twenty per cent to his school's score, but will refuse if it is only presented to him as a sanitary measure."

"Numerical values also give a teacher one additional argument for asking her board for equipment. It is 'their quota' which must be reached if their school is to 'go over the top.'"

In some states standardized schools are given tablets, banners or certificates and in others awards of certain sums of money are given in the form of a bonus to the teacher, and in still others this money goes to enlarge the equipment of the school.

The question may arise as to who determines the merits of these schools, and are they awarded fairly? In some places the county superintendent and in others a mem-

ber of the State Board of Education and in still others officials work in conjunction in carrying out this work.

About twenty years ago the little cross-lighted school house represented the ideal building. In those days heating and proper sanitation could be easily satisfied by a stove in the center of the room, an open water pail with a common drinking cup and seats arranged in a stairstep fashion. And yet, it must be said with great regret, that there are still many schools of just the type described above and will be until the people demand something better.

Probably the greatest good that standardization has done has been to furnish a means of measurement. It has caused school grounds to be enlarged, buildings to be remodeled so as to provide for proper lighting, new buildings to be built, outside toilets to be screened and very often inside toilets installed. Teachers' salaries have been raised, and this with other conditions have caused teachers to remain in the district longer. School attendance has been increased and community interest intensified. These good effects have not only benefited one certain school in question, but because of its improvement others have sought to equal it, and therefore great improvements have resulted. There have also been many other good results, such as community meetings, passage of sanitary laws, etc.

But the standardization movement has not been all success and over standardization is an evil to be avoided. Details may be too complicated and therefore too much time would be required in living up to them. Some score cards may be vague and easy to misinterpret. For an example, agricultural equipment might be a text book or it might mean several agricultural books, bulletins, laboratory apparatus, some plots of ground and a greenhouse. The same might hold true when it comes to selecting so-called "standard pictures" or victrola records.

Then it is possible for a standardized school to become self-satisfied and therefore not put forth enough effort after standardization has been reached. In other words, when a good building and an A No. 1 teacher have been secured, too often the community will say, "It is finished; we have reached the goal," but this should not be the case, for after standardization has been achieved we should look forward to consolidation. Unless a standardized school shows the community the need for consolidation it has failed to a certain extent. The rural people should in every case catch the vision of consolidation even if it is geographically impossible and standardization is one step in that direction.

THE EUROPEAN CORN BORER.

During the latter part of September, in addition to the regions already quarantined to control the European Corn Borer, the following counties had quarantine regulations established to prevent the further spread of the pest: Plymouth and Norfolk in Massachusetts, Rockingham in New Hampshire, Erie, Fulton, Montgomery, Rensselaer, Schenectady, and Schoharie in New York.

As far as is known it has not been found in the Mississippi valley. Several native borers closely resemble it and so cases of mistaken identity are frequent. The common smartweed borer larvae is quite similar but the spots on its back are much larger and closer together than those of the European borer which are rather small and are separated by more than the width of a spot.

NEW FEATURE OF PURDUE APPLE SHOW.

Among the many new features which are to be incorporated in the Sixth Annual Purdue Apple Show is an identification contest. This is open to all students in the University and promises to be very interesting. Mr. H. H. Swaim, secretary of the State Horticultural Society, has personally offered a set of "The Apples of New York" to the winner of the contest. These are the standard books on apple varieties and well worth working for. The varieties to be identified will be largely those which are commonly grown in Indiana and with which everyone should be familiar.

The show this year will be held during Farmers' Week, January 10 to 15, 1921. Premium lists may be obtained by writing to N. W. Kempton, manager Purdue Apple Show, 1109 South street, Lafayette, Ind.

The portable electric milker is the newest thing in milking machines. No pipe lines and no engine necessary.

SULPHATE OF AMMONIA

Its Production in the United States

Nearly a century ago Dr. George Fownes in a prize essay (''Food for Crops''), published in a Journal of the Royal Agricultural Society, wrote as follows:

''I would once more call attention to the salts of ammonia. Should these really be found to produce the beneficial effects anticipated, we shall possess at home, within the limits of our own island, resources for the improvement of agriculture compared with which guano and nitrate of soda, and all such things, are quite insignificant; resources which only require to be judiciously used to produce the most extraordinary results.''

The World's Capacity and U. S. Production.

During the last half century *Sulphate of Ammonia* has been used in ever increasing amounts to supply nitrogen to agriculture. Because of its merits as plant food, as an ingredient in mixed fertilizers, and also because of its relation to other industrial processes, it has become one of the greatest nitrogen carriers of the world. During the period from 1915 to 1919 the world's capacity for *Sulphate of Ammonia* has increased from 1,100,000 tons to over 2,000,000 tons at least and possibly more, if German figures are accepted. The increase in the United States alone has been from 190,000 tons in 1915 to 423,000 tons in 1919, and possibly half a million in 1920.

The Source of Supply

The domestic supply of *Sulphate of Ammonia* comes from bituminous coal, treated in the by-product coke oven or the coal gas retort, the former yielding ninety per cent of the total. As only half the coke now used in steel making comes from by-product ovens, and as the steel business is increasing, it is not improbable that the next five years will see a capacity of a million tons of *Sulphate of Ammonia* in the United States alone.

A Possible Saving of $800,000,000.

Nor is this the limit of the possible recovery from our coal. Recent government reports state that in 1918 the country consumed 485,000,000 tons of coking coal, of which only one-sixth is actually being coked. If the remaining five-sixths were so treated, the coke would become available as the much desired smokeless fuel to replace and supplement our waning anthracite supply, for all industrial and domestic purposes. We would also save by-products valued at $800,000,000, including 5,000,000 tons of *Sulphate of Ammonia* now annually wasted.

This does not take into account the additional supply of *Sulphate of Ammonia* from the various processes of fixing atmospheric nitrogen, which loom large on the immediate horizon. It may be noted, however, that wherever there is a choice as to the nitrogen compound produced, *Sulphate of Ammonia* is the one preferred for agricultural use.

Such an outlook certainly justifies renewed efforts on the part of our Experiment Stations and our Agricultural leaders in determining and recommending the most efficient methods of using *Sulphate of Ammonia*, a field in which, compared with other carriers of nitrogen, but little has been done. Our knowledge of its effects in agronomy, in olericulture and in horticulture is as yet sadly lacking in scientific basis and in technical detail. Greater knowledge can only come from careful research and accurate experimentation.

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Some Facts About the Seed Business

By C. A. Garner, '21.

THE average layman thinks of a seed company as a large organization selling all kinds of seeds which the seedsmen produce themselves on a very extensive yet carefully operated farm. As a matter of fact the seed companies of today vary all the way from this ideal conception to the very opposite type where little or none of the seed sold is grown by the firm. The average seed company, however, cannot be classed in either of these extremes. The majority of seedsmen make a specialty of growing one or two or at best a few seed crops for which their location and market are adapted or their experience and training give them a marked advantage over competitors.

For example, one large seed company in the east which is well known as a dealer in all sorts of field, garden and flower seeds has specialized in the production of sweet pea seed and has hired the most competent growers of that crop and purchased large tracts of land in which to grow them in California, where this crop attains the acme of perfection. That same seedsman has also given particular attention to beans and has bent every effort to improve that crop by selection, breeding and growing in the most favorable producing regions. But to the remaining long list of vegetable, flower and field crops he has given no special attention but secures them either by letting the contract of growing them to a private farmer or concern that makes a business of growing on contract, or buys them from seed brokers, importers or other sources that are considered reliable.

In a similar manner, another seedsman in the east, although dealing in all kinds of seeds, produces less than half of them on his company's own ground and makes a specialty of growing flower bulbs, tubers, etc., such as tulips, narcissi, croci, gladioli and dahlias. Still another seedsman in Michigan has earned an enviable reputation for himself by devoting a large part of his seed farms to the production of improved strains of radish seed. He, like the others mentioned, advertises and sells other seeds obtained elsewhere.

To the casual observer these men appear to be employing disreputable methods. However, after a moment's consideration, it is clear that no seedsman can grow the several hundred varieties of food and ornamental plants listed in his catalog in as careful and scientific a manner as they are grown under the existing system and in sufficient quantity to supply the trade.

The fact that seed companies do not grow all their seed, however, is not usually advertised and might be termed as one of the trade secrets. Despite the impossibility of personally growing or supervising the growing of all the seeds sold, the seedsmen, in my opinion, are not justified in deceiving the public in the matter. Just as good seeds can be grown by letting some contracts, and the public could be reconciled in a very short time to the real methods if all seedsmen would just agree to publish accurate statements in their catalog telling the actual source of their supply where they had occasion to tell and where they were tempted to cover the facts up by intimating that they themselves had grown all the seeds.

As the seedsmen get their organization perfected to a higher degree these changes will very likely be brought about, for in their present association considerable discussion is now heard on the subject, while a few have already begun to publish the whole truth in regard to the source of their seed supply. On the other hand, the issue being purely a moral one and common to all seed concerns, a change will neither increase or decrease the volume of business. In fact some prominent seedsmen have facetiously declared that it is just as well to keep the public in the dark, for they say, "The people like to be fooled that way." In their hearts, though, they welcome the new era.

Another revolution which is imminent in the seed business and one which every good, reliable, serious minded dealer hopefully strives for is the reduction of the number of names given to the standard varieties of vegetables and flowers. At present a variety of muskmelon, for instance, is introduced by a seed company and proves to be

(Continued on page 122)

AS BROAD AS AGRICULTURE

ORGANIZED and spread out like a great army, the International Harvester service organization reaches all places where there is agriculture and stands guard over International farm machines and implements numbered by the million. Here in the United States, 92 large branch houses, directing and supplying over 15,000 local dealers, protect the owners of International Harvester-made farm equipment against irritating, profit-reducing delays. Repairs and expert service are always near at hand and quickly obtainable.

AND BECAUSE of this good after-sale service, plus service-proved quality and time-acquired manufacturing experience, the names *McCormick, Deering, International, P. & O.,* and *Chattanooga,* have come to be recognized as guarantees of the fullest possible measure of satisfactory, profitable performances as applied to the products they represent. These products, over fifty in number, are sold by International dealers everywhere—*farm machine headquarters in their respective communities.*

INTERNATIONAL HARVESTER COMPANY
OF AMERICA INC.
CHICAGO U S A

The Chinch Bug Pest in Indiana

THE prevalence of the chinch bug, Blissus leucopterus, in several sections of Indiana the past summer, and the unusually favorable weather the past fall would seem to indicate or forecast a possible danger to crops next year. For a number of years farmers of southern Illinois have had to contend to a greater or less degree with this enemy of corn, wheat and grasses, and at times have been unable to save their crops from the inroads of this persistent feeder. The chinch bug is a small sucking insect, ⅛ to ⅙ inch in length, black with a triangular white spot on each wing, and legs of a reddish brown color. The young are more or less of a reddish color but gradually darken as they approach maturity. Although quite small, this bug can be easily identified, is to be found in small numbers every summer. On account of its size and its habit of living close to the ground, it usually escapes the notice except when it occurs in large numbers.

The chinch bug hibernates over winter as a mature insect in dead grass, brush heaps, fence corners and in other waste places. The warm spring weather brings the bugs out of hibernation and they fly to favorite feeding and breeding grounds in the vicinity. These are usually grass or small grain fields, and it is here that the over-wintering bugs deposit eggs for the brood which is usually so destructive to corn. The young bugs hatching from eggs laid on the stems and leaves of grasses and small grain begin to feed immediately, sucking the juice from the young plant and preventing its growth. As the bugs are not mature as a rule by the time the grain is harvested, they are forced to migrate to new fields, and at this season corn is the chosen host because it is still green and succulent. When abundant the bugs swarm into corn fields killing the plants as they travel. When the bugs mature they lay eggs on the corn or fly to neighboring grass fields to lay eggs for the next brood. The young of this brood mature by September, and as cold weather approaches they seek sheltering places as mentioned above.

One of the best means of combating the chinch bug is destroying them in their hibernating quarters. All thick dead grass should be burned in late fall, early spring or during the winter months. Brush piles, rubbish heaps and fence corners should be cleaned up and thoroughly burned to destroy all hibernating adults. Farmers in an infested area should cooperate and work as a unit in cleaning up to destrop the bug in its winter quarters. If this is done the importance of the chinch bug in Indiana will be greatly lessened.

As corn is the crop usually essential as a late summer host, its elimination in the rotation may be advantageous where corn is not a big money crop. Following experimental trials in southern Illinois, it was found that in an infested area soy beans when grown in place of corn yielded a per acre return of from $40 to $50 as compared with a corn yield of $2 to $10 per acre.

When large armies of chinch bugs appear the only efficient method of preventing their entrance into corn fields is the use of heavy road oil, creosote, or coal tar as a barrier. A narrow space around the field to be protected is cleared and the barrier material poured so as to make a solid line around the field. Post holes, 18 to 20 inches deep and 20 feet apart, should be made and properly sloped so that the bugs following the barrier line will fall into the trap hole. Road oil and coal tar act as impassable barriers and must be renewed as they become ineffective because of dust or hardening. Creosote acts as a repellant because of its odor. If treatment becomes necessary after the bugs have entered the corn field, a 1 to 1000 solution of "Black Leaf 40" will usually do the work in good style and often save the corn crop.

The chinch bug has many natural enemies which are constantly at work helping keep down this pest. The quails destroy large numbers of these insects, especially during the cold winter months when food is scarce. At such times they can be seen in grassy patches diligently searching for their prey. The small chick-a-dee also depends upon the small bugs for a large portion of its food. Several species of beetles, especially the common "lady bugs" feed upon the bugs during the summer months. A wasp parasite which attacks the egg is known to be of value in some sections of the state, but so far it is not known to occur in Indiana.

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NATCO barns are warm in winter, yet cool in summer. They provide year-round comfort for your cows. More comfort in the stable means more milk in the pail — more money in the bank.

The hollow spaces in a glazed Natco Hollow Tile wall provide a blanket of still air through which heat, cold or dampness will not pass.

And the cost? Perhaps a little more at first, but *far less* in the end than for other construction. The saving in insurance and upkeep will repay the added investment within a few years. All further savings are clear profit.

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Section of Natco Wall showing still air spaces.

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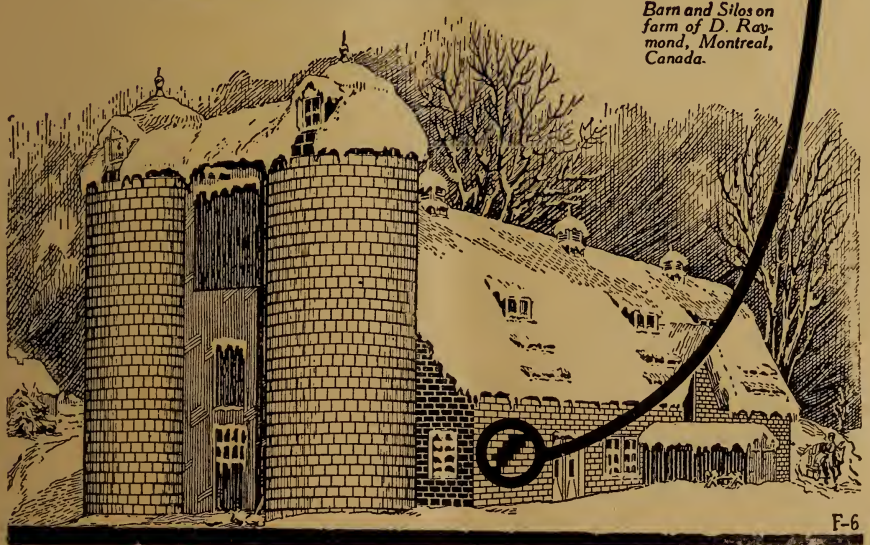

Barn and Silos on farm of D. Raymond, Montreal, Canada.

F-6

Christmas Parties and Entertainments for the Rural Community

By Catharine M. Christen, '21.

ONE of the hopeful signs of the after-war period is the greatly increased interest in all kinds of community development projects, particularly those having to do with the general welfare and the human side of community life. This increased interest is largely due to the increased ability to engage in cooperative undertakings, an outcome of the war period, and to a general appreciation on the part of all thinking people of the serious social and economic crisis which is confronting our country.

Unselfishness and the spirit of cooperation are the fundamental principles of community life. The entire community must be bound together by some common aim in order to make the accomplishment of any project affecting the interests and welfare of so many people a success. The natural lines of division which are occasioned by various forces in the community must be submerged or overlooked. There is no better time to emphasize community cooperation than at the Christmas season. The spiritual significance of Christmas time, if properly treated, contributes to the general spirit of good will and friendliness.

Probably the most common types of community celebrations at Christmas time are those which center about the school and the church. For such entertainments, plays which endeavor to voice the Christmas spirit in some special way, are very desirable. Also, music should occupy a very important place in such a program, both by special groups of singers and by the community singing of well-known Christmas carols. Besides the school and church celebrations, the old-time "neighborhood parties," though less extensive, are excellent means of fostering both the Christmas and community spirit. These vary greatly in form because of the wide range in the type of guests (age and sex), in the locality and in the number attending the festivity. One must know the existing conditions, that is, the customs of the community, the type of persons who will be present and the number expecting to attend in order to plan a party of this kind. One needs always to study the group she is to work with before any definite plans are made.

One of the most important things to provide for in the home party, as well as in the church and school celebration, is the community singing of Christmas carols. Community singing has a welcome influence in any large gathering and especially so at Christmas time. The people in this country do not sing together enough.

For any large gathering a set program at the beginning will be helpful in starting the party. This may be in the form of contests previously arranged for or other features, such as readings or special music.

Charades are admirable as means of entertainment and are often used in starting the party. Here are some words that are good for charades:

Attenuate (at-ten-you-ate).
Ingratiate (in-gray-she-ate).
Catering (Kate—her-ring).
Commentator (common Irish potato—"tater").
Heroes (he-rows).
Tennessee (Ten, I see).
Penitent (pen-i-tent).
Necklace (neck-lace).
Pantry (pan-tree).
Carpet (car-pet).
Welcome (well-come).
Antidote (ant-i-dote).
Definite (def-in-ate).

Our No-Freeze Stock Fountain
is a **wonder.**
It keeps the **water warm** in winter. **cool** in summer.
Can move your water supply to any part of the farm.
Write for catalogue **today.**
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N. Walnut St., Crawfordsville, Ind.

Impromptu performances often cause much amusement and are therefore good ways of entertainment. The hostess may have prepared slips of paper bearing names of such "stunts" as: dance a jig; sing a song; tell a funny story; make a speech; pose as a statue; impersonate an actor; preach a sermon; teach a class in geography; illustrate a class in gymnastics; repeat a bit of Shakespeare (or some other author); give a Mother Goose rhyme; give in pantamime a lady dressing her hair in front of a mirror; play the piano; assume attitudes of anger, grief, jealousy, remorse, horror, ecstasy, etc., in quick succession; imitate various barnyard noises; or hold a conversation with an imaginary friend, or with some noted historical character. These slips might be passed out to the guests just before the hostess desires to have the "stunts."

Another game which might be used is "Christmas shopping." In this game one person is chosen as purchasing agent and the rest of the guests are secretly given names of Christmas toys which they are to represent by sound or action. All of the "toys" line up in a row and when called upon to exhibit themselves must take the part of the toy which they represent. As the purchasing agent guesses the toys from their actions or signs, they are "placed" aside until the purchasing agent has finished his "buying." When he has finished, he begins to carry the "articles" off with him. Every "toy" must follow the purchaser around the room, each one exhibiting his individual movements and making the noise required. It is often very funny to witness the procession of jumping jacks in action, tin horns blowing, autos "honking," etc.

The following apple-eating contests are very appropriate for winter parties:

1. Suspend by strings from the limb of the tree or from chandeliers or doorways any number of apples, which should be at the height of the players' chins, tie the hands of each player behind him and at the given signal let each begin eating his apple. Player who first devours his apple wins the game.

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Universal Package

INCREASES YOUR PROFITS BECAUSE

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—it prevents crushing and bruising
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Package Sales Corporation

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2. Handicap player as above, but place apples in a large pan or tub of water.

3. Handicap players as above, but place apples on the floor.

4. Handicap players as above, but place apples in open hands of other players and let them eat in the manner of "feeding the animals."

Another form of entertainment is the exchange of inexpensive gifts either from the Christmas tree or from a "grab bag." Sometimes the gifts are numbered and correspondingly numbered slips are drawn. Sometimes these gifts are sensible and useful, though inexpensive, at other times are foolish and given merely for amusement.

Decorations for the Christmas celebration should be simple and appropriate. The winter bouquets of bitter-sweet are very effective. Boughs of evergreen are most suitable for chandeliers, doorways and stairways. The Christmas tree, either normal size or miniature, is a very admirable means of decoration. Of course, the Christmas bells and crepe paper decorations may always be used. And last of all, an open fire is most desirable whenever possible.

Fruits and candy are perhaps the most usual Christmas party refreshments. Apples and popcorn are often used. If there is an open fire the toasting of marshmallows or popping of corn at different times throughout the evening may be arranged.

The main objective of the Christmas party is to emphasize and develop cooperation and the Christmas spirit of love and service through kindness, cheerfulness and hospitality.

SOME FACTS ABOUT THE SEED BUSINESS.

(Continued from page 116)

very popular. A competitor gets a start of the seed and after multiplying it in sufficient quantities to put on the market sells it under some other name which he gives it. In reality the buyer is not getting anything different from what is already on the market and possibly in his own gardens. The Rockyford Muskmelon is a salient example of this practice, having been sold under a half dozen different names, such as Netted Gem, Petosky, Paul Rose and others. Tomatoes, potatoes, mangoes, cabbage, corn, various flowers, and indeed nearly all crops of importance have been the victim of this practice, and I know of no seedsman that would not admit his guilt.

The tendency now in the seed trade is for all seedsmen to call all the standard varieties by their real or original name. Then if a new variety or strain is created and introduced all competitors listing it in their catalogs advertise it under the same name, thus giving every firm an equal chance of selling it and enabling the buyer to select varieties intelligently and accurately regardless of where he buys. The fact that the United States has experienced a stimulation of interest in seed growing and distributing since the war, due to the curtailment of the industry in Europe, justifies our hope for an early change in the business policies in this country.

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DRAIN TILE, BUILDING BLOCKS, SILOS
Sweetser Drain Tile comes in all sizes from the smallest for lateral ditches, to the largest for big drainage systems. Underdrainage pays 50% to 100% every year. You cannot farm successfully without thoroughly underdrained land. Write for prices and number of tile required for carload.
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Sweetser Silos are giving efficient service in practically all parts of the middle west. They represent the highest type of silo construction on the market today. We use our special hollow silo tile and build the silo complete, plastered inside. 72 repeat orders, each man having from 2 to 7 Sweetser Silos. You are entitled to the best—get a Sweetser Silo and avoid disappointment. Write us for full particulars.
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SWEETSER BUILDING BLOCKS
SWEETSER DRAIN TILE
SWEETSER SILOS

HARD THIS WAY
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EASY ON A TRACK
THE CLETRAC WAY

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EVERY year a great army of practical, business farmers are swinging 'round to the use of power.

You'll soon be in a position to advise new tractor buyers on the make and type best fitted to their needs. You're probably getting a line on tractors now. We want you to know the tank-type Cletrac.

The Cletrac is seldom idle. Two broad tracks carry it easily over snow and mud without sinking in or loss of power. It lines up readily to wood saw, feed grinder, stalk cutter, etc.—stays lined up, too, and its heavy-duty motor delivers a steady flow of economical power for all belt jobs.

Tank-type construction—short-turn ability—full-rated power under all conditions—simplicity and ease of operation—all combine to make the Cletrac a profitable year-round farm unit.

We will gladly furnish you with valuable power-farming data. Write today:

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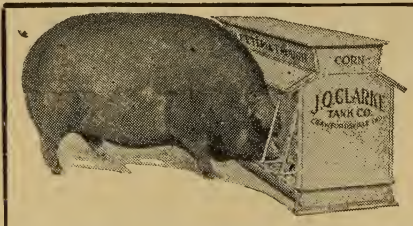

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is the most **wonderful** feeder on the market. Will feed down and out **all kinds of feed** better than any other feeder. Write for catalogue today.

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PURDUE STUDENT AGENTS
wanted to take orders. Write for terms.
THE SANATAR CO.
301 Indiana Trust Bldg. Indianapolis, Ind.

POINTERS IN CARE AND OPERATION OF CREAM SEPARATORS.

By A. R. Robbins.

THE separation of cream from milk has advanced by steps from the shallow pan method to the present centrifugal method. The separators of the present day are able to skim very efficiently and the standard types will with proper handling skim as low as .02%.

In the operation of a separator two prime factors are involved. First, the mechanical factor which depends on the correct adjustment of the machine. Second, the human factor which depends on the operator and his knowledge and care of the machine. The first factor is taken for granted, that is, the machine will do the work if properly assembled and anchored. In connection with anchoring, the base should be as firm as possible, preferably concrete. Absence of vibration is necessary for clean separation.

The second factor depends on the operator entirely. The following conditions are responsible for production of good cream by clean skimming and are controlled by the operator.

1. The separator should be placed on a firm foundation in a clean, well ventilated room, free from offensive odors.

2. The turns per minute should be those recommended for the machine.

3. The temperature of the milk should be from 90-95 degrees.

4. The separator should be cleaned after each skimming; the bowl should be taken apart and washed together with the rest of the tinware. If the separator is allowed to stand even an hour unwashed there is danger of contaminating the next lot of cream.

5. Wash the separator bowl and all tinware with luke warm water, using a brush to clean seams and cracks; lastly, scald with boiling water and leave the tinware in a sanitary place to dry. Use lukewarm water first, as hot water will coagulate the milk and make it hard to remove. Use no towel or rag to dry the tinware.

6. Rinse the milk-receiving can and separator bowl with a quart or so of hot water immediately before running milk into the separator.

Skilful Feeding

is the secret of maximum milk yield

Feeding cows a generous balanced ration of palatable feed containing the right proportions of protein, carbohydrates and fat will insure a full yield of rich milk. The difference between profit and loss in dairying is mainly a matter of **feed.**

ACME Dairy Feed

is a balanced ration. The experience of many years goes into its making. Every ounce of it is pure and wholesome. It contains no cheap fillers and no waste.

Acme Dairy Feed produces results. It is palatable—the cows like it—and it contains the exact proportions of health-giving milk producing elements necessary to secure a maximum yield of milk.

Acme Dairy Feed is used by thousands of the leading dairymen of the country and has stood the test of many years.

Ask your dealer for ACME Feeds

Make every cow a 100% producer by using the palatable balanced ration—Acme Dairy Feed.

There is an Acme Feed for every animal.

ACME Hog Feed
ACME Scratch Feed
ACME Stock Feed
ACME Horse and Mule Feed
ACME Farm Feed
ACME Barleycorn Feed
Alfalfa Molasses Grain Feed for Horses

ACME-EVANS CO.

INDIANA'S LARGEST MILLERS

INDIANAPOLIS - - INDIANA

This is a season of the year

when it is a pleasure to exchange fraternal greetings which cement the cordial relationship and good feeling which exists between us.

We wish also to assure you that our best endeavors will be to maintain that quality and service which has given character to the Wyandotte products. And in extending to our friends sincere and hearty Holiday Greetings, we desire for you an abundance of the best things in life, and may the coming year bring health, increased wisdom and happiness.

Indian in circle in every package

THE J. B. FORD CO.,
Sole Mnfrs., Wyandotte, Mich.

7. Cool the cream as it comes from the separator to about 50 degrees and keep it cool until delivered.

8. Separate the milk after each milking while it is still warm as this saves heating the milk, which is necessary if it is allowed to stand.

Two important factors directly under the operator's control that influence clean skimming are: the speed of turning and the temperature of the milk. A great many tests have been run on these two factors.

This chart is from the data published in the C. U. Bull. 360.

Separator	Revolutions of Crank per Minute			
	60 r. p. m.		50 r. p. m.	
	% F. Cr.	% F. S. K. M.	% F. Cr.	% F. S. K. M.
No. 1	30.9	.024	21.3	.034
No. 2	28.1	.036	27.6	.041

This data is similar to that compiled from many other trials and shows conclusively the loss in skim milk due to slow turning.

The influence of temperature on clean skimming is still greater.

Temperature—% Fat.

Separator	TEMPERATURE							
	90		80		75			
	% Cr.	% S. K.M.	% Cr.	% S. K.M.	% Cr.	% S. K.M.	% Cr.	% S. K.M.
No. 1	29.8	.020	36.7	.039	43.1	.069	------	------
No. 2	28.1	.036	------	------	31.2	.050	39.5	.254
No. 3	21.0	.031	21.7	.053	------	------	------	------
No. 4	29.5	.020	------	------	30.9	.024	------	------

This data shows that temperature has an even greater influence than speed of the crank. The loss due to separation at 70 degrees amounts to .223% of fat.

Therefore the financial loss would be as follows:

No. Cows	Lbs. Milk Yearly	Loss in B. Fat	Price B. F.	Loss
5	20,000	44.5 lbs.	.56	$ 25.00
20	80,000	178.0 lbs.	.56	100.00

From this data can be seen the loss resulting from neglect alone. When your machine is installed be certain it will skim very close to .03% and occasionally have a test made of the skim milk to see if it is still performing correctly.

Plans are being developed since the National Dairy Show at Chicago for a meeting of a world dairy congress in the United States similar to those conducted in Europe before the war.

HEADS ALL HERDS
In Iowa Cow Testing Associations

The Quaker Oats Company, Chicago, Ill.

McGregor, Iowa, Jan. 30, 1920

Gentlemen: — I am pleased to state that we have used SCHUMACHER FEED quite extensively in growing and developing our herd.

It is a great aid in promoting heavy production of milk and butter fat. We appreciate it much because of its perfect balance which makes it a safe feed to use in large quantities when feeding for heavy production.

We have fed SCHUMACHER FEED with excellent results to hogs and horses as well as to the Dairy Herd.

Yours very truly,

R. G. KINSLEY.

Note: { **R. G. Kinsley's Herd has been making the best record in the McGregor Cow Testing Association, which for several months has been leading all Testing Associations in Iowa, having the best ten highest producing cows.**

The Schumacher Feeding Plan
Will Help the Cows Increase Production

The Schumacher Feeding Plan consists of feeding SCHUMACHER FEED as the carbohydrate part of the ration and BIG "Q" DAIRY FEED as the protein part. These two feeds have proven with dairymen everywhere to be the ideal combination for best health conditions and maximum milk production. They simplify your ration problem—insure greater accuracy and uniformity, and require much less labor.

SCHUMACHER FEED is a finely ground, kiln dried, carbohydrate ration composed of various grain by-products that best supply the necessary maintenance for long time milk production. It affords that much needed variety of grains so essential and necessary to keep your cows in tip-top physical condition—to provide stamina and endurance to withstand the strain of long milking periods.

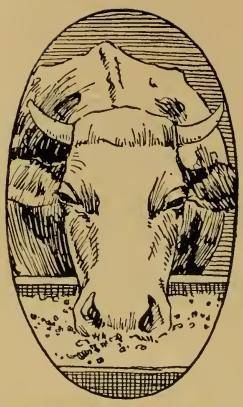
In addition to being the acknowledged **best** carbohydrate feed for dairy cows. it is also wondertul milk producer. With SCHUMACHER FEED as the maintenance part of the ration and BIG "Q" as the milk producing part, you have a ration that assures maximum production from ***any*** cow of ***any*** breed.

SCHUMACHER FEED in addition to being the acknowledged ***best*** carbohydrate feed for dairy cows, is also splendid for feeding all your farm stock. It puts "pep" and vigor into your horses—makes calves and hogs grow fast and produces big frames. It restores strength and vitality so dry cows assuring maximum milk production during the next lactation period.

Get a supply of SCHUMACHER and BIG "Q" from your dealer —let these feeds do for ***you*** what they are doing for thousands of other successful dairymen and farmers.

The Quaker Oats Company

Address, CHICAGO, U. S. A.



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International Special Dairy Feed is a concentrated milk-making ration. Higher milk production *must* follow when this feed is properly used. Balance your hay and silage or home-grown grains with

INTERNATIONAL SPECIAL DAIRY FEED

It is a highly palatable and digestible molasses feed.

Feed International Special Dairy Feed in accordance with directions and you can increase the milk production of any cow in your herd from 60 to 100 gallons during a 6 months' period as compared to results from using any other feeds of similar analysis.

This result is guaranteed. Our check to cover guaranteed increase will be mailed you if you are not satisfied. Order your trial ton of Special Dairy *today* from your dealer. Write us if you need further information.

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For cheese and butter making on the farm as well as in largest creameries and cheese factories, Hansen's preparations are standard. They are **pure, concentrated, and simple to use.**

Use **Hansen's Rennet Tablets,** Rennet Extract or Lactic **Ferment Culture** for cheese making (in the small dairy **Junket Brand Buttermilk Tablets** are used to advantage for cheese making).

Hansen's Danish Butter Color, and **Hansen's Cheese Color** are used in the finest creameries and cheese factories. Hansen's products are on sale at drug or dairy supply stores or sent direct.

"The Story of Cheese Making," by J. B. Frederiksen, free on request.

Chr. Hansen's Laboratory, Inc.
Little Falls, N. Y.

FOREMOST AMONG BETTER GRINDERS

Crush and grind all the grains that grow. Fine for hogs or moderately coarse for cattle feeding.

Strength, durability and service radiate from every line of these powerful mills. Simple but effective in adjustment. A strictly high grade piece of machinery for the farmer or miller.

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It pays well to investigate.
10 sizes: 2 to 25 H. P. or more.
Write today for FREE catalog.

THE C. P. BOWSHER CO.,
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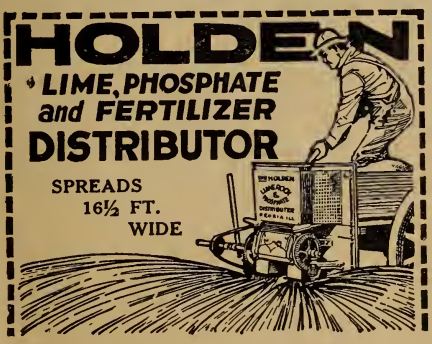

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Consider well this important fact and let us handle your next shipment.

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Kingan's Digester Tankage

(HOG FOOD)

Manufactured in accordance with the Indiana Feeding Stuffs Control Law—Guaranteed to contain not less than 60% Protein, 6% Fat. Is recognized as one of the leading brands on the market and a very profitable article when fed at any season throughout the year. A trial will convince you of its merits.

Insist on obtaining "KINGAN'S" Digester Tankage of your dealer.

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BEEF AND PORK PACKERS,
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Progress Trees and Plants Grow

because they are propagated right, dug carefully and packed securely. Let us prove that statement by shipping your stock to you before you pay for it. And besides we will pay the freight.

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The PURDUE AGRICULTURIST

JANUARY, 1921

Vol. 15 No. 4

Hold Back anything needed Here and it shows Here

A COW can give milk to her fullest capacity only when fed the right proportion or balance of milk-making materials. Milk is made up of *protein, carbohydrates, fat, minerals* and *water*, in proportions that practically speaking can't be varied. Instead of making imperfect milk, a poorly fed cow gives less milk.

Cows seldom get enough protein or enough calcium

For that reason, a large part of the roughness and home-grown grains is often wasted. You have to give your cows twice as much grain feeds as when you feed Purina Cow Chow.

Feed Purina Cow Chow

and your cows will get all the protein and calcium needed to balance your carbohydrate roughness. The roughness usually wasted will be used in making milk and a big increase in milk will result.

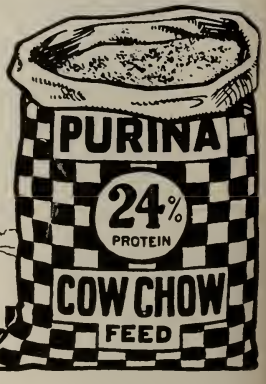
All we ask is that you give Purina Cow Chow a trial, and let your milk scales show you why you should keep on feeding it. Get the facts as feeders tell them, from a free booklet, "The Purina Cow." Write today.

Sold in Checkerboard Bags Only.

RALSTON PURINA CO., St. Louis, Mo.

Ft. Worth, Texas. Nashville, Tenn. Buffalo, N. Y.

Purina Cow Chow



Sending Horse Power Nation-Wide

FAR up in the hills the force of a waterfall is being changed into that invisible power which runs through a wire.

This power, electricity, is always available because it can be carried from the place where it is generated to the place it is used, quickly, cheaply, safely, and in any amount. A coal mine in Pennsylvania and a waterfall in Maine may feed the same system of wires, to supply power for an industry in Massachusetts and for a water pump on a Delaware farm.

The General Electric Company has provided the means for developing Nature's dormant resources into electric power and transmitting this power. In addition, it is constantly creating or bringing nearer to perfection, apparatus to apply this power and devices to regulate and distribute it to greatest advantage.

And in doing this, the General Electric Company is unceasingly striving to conserve raw materials, such as fuel, which may better serve mankind in other ways.

95-332 I

GENERAL ELECTRIC COMPANY

What We Found Out

Health Conditions a Big Factor

The Quaker Oats Co.

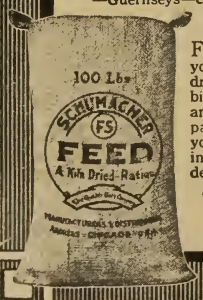
Gentlemen—I must say to you frankly that in my letter to you concerning feeding of Holstein Friesian Cows on my Arden Farms, I overlooked the most important factor, which I wished to bring out. I do not believe in a high protein ration. After the experience I have had, it is my judgment that breeders do not place enough importance upon the maintenance part of the ration of a cow. To secure a maximum yearly production means that a cow must be kept in good physical condition, nothing must be done to tear down the structure. It is my judgment that too much protein is injurious. There is good chance for argument as to just how much protein a cow should have, but I do not wish to engage in a discussion of the fine points, but I believe that a small amount of protein is better than too much, if one expects to have cows go on year after year and maintain their good health and produce their maximum of butter and milk. We mix most of our feed ourselves with the exception of SCHUMACHER FEED and BIG "Q" DAIRY RATION, with which we have been very successful.

Yours very sincerely,

ARDEN FARMS, St. Paul, Minn. (Signed) J. M. HACKNEY.

SCHUMACHER FEED AND BIG "Q" DAIRY RATION

Wherever SCHUMACHER FEED and BIG "Q" DAIRY RATION are used you will find a herd that produces to the satisfaction of the owner. Holsteins—Jerseys—Guernseys—cows of every breed alike testify to the value of these result-producing feeds. 36 of the World's Champion Dairy Cows have made their wonderful records with the aid of these feeds.



Fed in combination they make an ideal ration—one which you can readily regulate as to amount of protein and carbohydrate content to suit the needs of each individual cow. Their palatability, high digestibility, variety and bulk, induce cows to eat ***heartily*** and produce ***heavily***. With SCHUMACHER FEED as the maintenance part and BIG "Q" as the protein part, you have a ration that will give you maximum long time milk production and ideal health conditions in your herd. A few weeks trial will convince you. Order from your dealer. If he can't supply you, be sure to write us.

The Quaker Oats Company

Address: Chicago, U. S. A. (116-S)

F-5

Placing the reinforcing steel of the door opening.

A Natco Silo

Costs a Little More— Lasts a LOT Longer

IT does cost more to build with everlasting Natco Hollow Tile than with materials that soon decay, but it's far cheaper in the long run. A Natco Silo will not rot, burn, burst or blow down. It has no hoops to tighten, needs no painting and seldom any repairs. You can pass a Natco Silo to your children practically as good as new. Or the farm will bring more should you wish to sell.

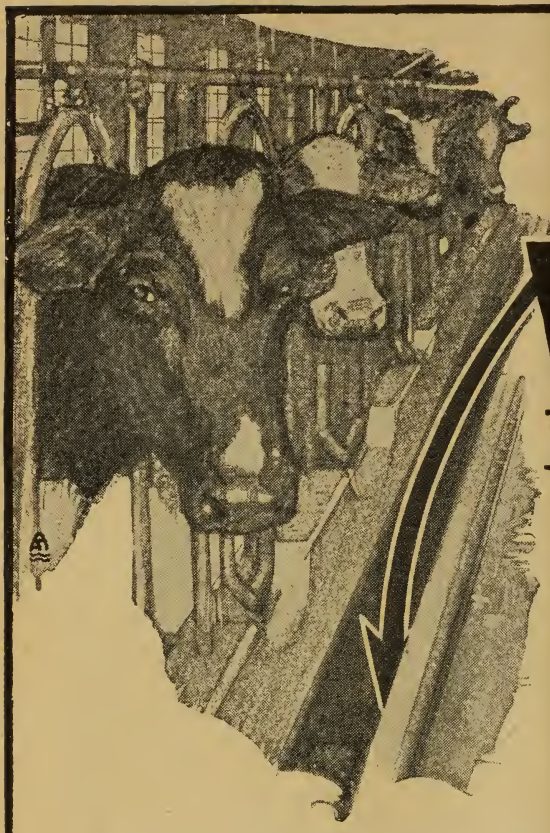
What do you intend to build? One of our farm building plans may help you—FREE while they last.

Farmers who figure costs closely are using Natco Hollow Tile for silos, dairy barns, hog houses, dwellings, etc. Our book "Natco on the Farm" describes and pictures many such uses. Send for it today — *no charge*. Ask your building supply dealer to quote you on Natco Hollow Tile.

National Fire Proofing Company
1221 Fulton Building
Pittsburgh, Pa.

23 Factories assure a wide and economical distribution

Foundation and bottom courses of a Natco Silo. Note the still air spaces and the steel reinforcing bands.



WHAT
Do *you* put in *there?*

FEED, yes. But—
WHAT KIND is it?

At the fairs and dairy shows, many of the most successful dairymen tell us they get more dollars' worth of milk out of a dollar's worth of BUFFALO CORN GLUTEN FEED, fed mixed with wheat bran or millfeed, oats, etc., than any feed they know of.

They probably never had anybody offer a reason *why* BUFFALO CORN GLUTEN FEED makes milk the way it does. They did not care WHY so much, as long as they got the milk. But the *very high digestibility*, in large measure, *accounts for it.*

See that there is plenty of BUFFALO CORN GLUTEN FEED mixture in the feed trough in front of your cows—and you will understand *why* BUFFALO CORN GLUTEN FEED is so well thought of on thousands of real dairy farms.

FEED UP! Your dealer should have BUFFALO CORN GLUTEN FEED. If he does not, write us for literature and sample, giving us his name and address.

Corn Products Refining Co.

New York — MANUFACTURERS OF BUFFALO CORN GLUTEN FEED — Chicago

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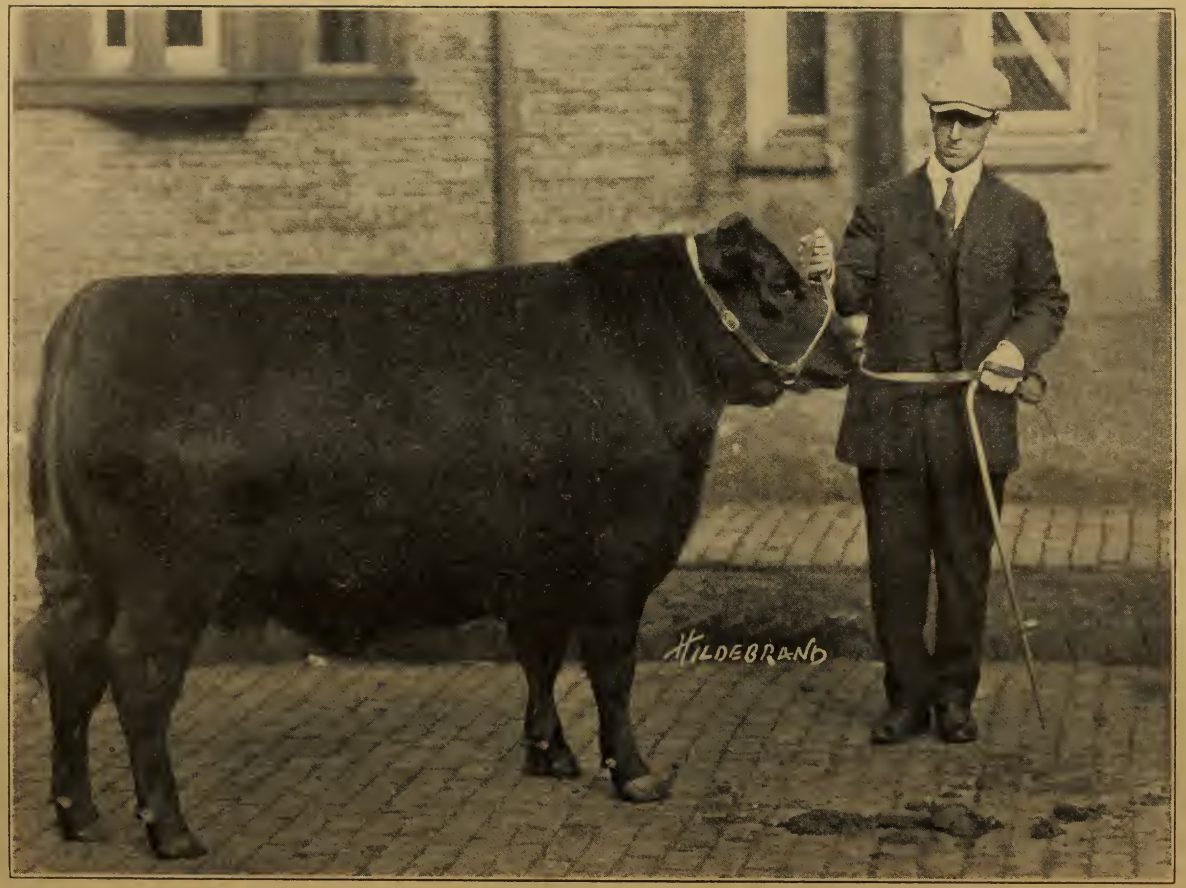
Entered as second class mail matter December 4, 1906, at the Post Office, LaFayette, Ind., under the Act of Congress of March 3, 1879.

Subscription Price One Dollar Per Year. **Advertising rates sent on application.**



Black Ruler, Purdue's Grand Champion Steer, at the recent International, and Jack Douglas who fed and fitted him.

The Purdue Agriculturist

VOLUME XIV JANUARY, 1921 NUMBER 4

Indiana and Purdue Win Again

By Prof. C. F. Gobble.

GRAND Champion Steer, the third in four years—another record broken. No other exhibitor, either breeder or college has made such a showing in the history of the INTERNATIONAL LIVESTOCK EXPOSITION. Every red blooded Hoosier should be proud of his State College, of Dean Skinner and of Jack Douglas. As an educational institution, as a Chief of Animal Husbandry and as a feeder of livestock, certainly no stronger demonstration could be planned and carried through than by the records made at this greatest of all livestock shows. In 1917 five steers, all sons of that famous breeding bull Lavender Sultan, took every first prize and champion ribbon offered in the Shorthorn steer classes at Chicago, as well as the Grand Championship of all breeds. In 1918 Fyvie Knight 2nd, a son of the half sister to Fyvie Knight, Purdue's Grand Champion of 1908, was awarded the purple, and again this year Black Ruler, the senior yearling "doddie," took the highest honors.

This seems like a wonderful showing, and it is wonderful. But best of all it is what it seems, a straight, clean Purdue triumph. Every one of these three steers, Merry Monarch, Fyvie Knight 2nd, and Black Ruler, was not only shown by Purdue University, but was bred and fed on that Hoosier College farm.

DEAN SKINNER
TELLS OF
The Farmers Federation
IN OUR
FEBRUARY NUMBER

Could any educational institution furnish a better demonstration of its teachings? Could it in any better way prove, if such proof is necessary, that there are certain fundamental principles upon which livestock production is based and if adhered to will bring success? We believe not. Let us study a bit the history of these three champion steers. On June 1st, 1909, the Dean visited Mr. J. W. Wheatley's farm at Kempton, Ind. When he came home he brought a cow with a heifer calf at side. The two cost One Hundred Five Dollars ($105), and the cow is the grand dam of Black Ruler. August 8th, 1910, he bought of Milton Fross, Burrows, Indiana, another cow and calf, paying Two Hundred Fifty Dollars ($250) for the pair. The calf, Fancy Queenette, later gave birth to Fyvie Knight 2nd. The next year, on October 17th, at Mr. J. S. Silverthorn's sale at Rossville, Indiana, he purchased Merry Semostress, the dam of Merry Monarch, for the sum of Eighty-five Dollars ($85). In three years for Four Hundred Forty Dollars ($440) were purchased five cows, three of which later produced three Grand Champions. Here it is clearly shown that extravagance is unnecessary in laying the foundation of a beef herd of good breeding, individuality and producing ability. But you say: What of the bulls? They most certainly play an important part in livestock

production. Lavender Sultan, the sire of Merry Monarch, cost Four Hundred Dollars ($400); Blackbird Prince 4th, sire of Fyvie Knight 2nd, cost Two Hundred Fifty Dollars ($250), and later sold for One Hundred Fifty Dollars ($150) at an advanced age; and Black Monarch 6th, the sire of Black Ruler costing Five Hundred Dollars ($500), was sold after three years of service for Ten Dollars ($10) more than his purchase price. In other words, the herd necessary to produce these three Grand Champion Steers that sold at public auction for Eighty-nine Hundred Ninety-five Dollars and Fifty Cents ($8995.50) cost just Nine Hundred Thirty Dollars ($930) after deducting the amount received in the sale of the two bulls. Nor is this all. You will find on Purdue Farm today Lavender Sultan, the three dams of the grand champion steers, and fifteen daughters, granddaughters, and great granddaughters of the three cows of the original purchase. The good work may continue.

You say it took something besides foundation stock—yes—intelligent feeding and careful management. This is the part played by Mr. Douglas. While these steers were kept in plain quarters, they were sanitary and comfortable. The stalls were darkened in summer and the steers turned out in dry lots at night. For feed, nothing was given that is not grown every year on the college farm except a little linseed oil meal, and Black Ruler did not even get any of that. The ration fed these steers toward the close of the feeding period was ground corn, ground oats, ground barley, steamed wheat, corn silage and a little clover hay. The old saying that "the eye of the master fattens his cattle" was never better illustrated than here. With common environment and ordinary feeds a master feeder developed maximum results.

The kernel of the lesson is this: even with limited or average funds and equipment a pure bred beef herd can be started and top notch cattle produced with Indiana grown feeds and careful feeding and management. Great honor comes to the State of Indiana and to Purdue University because of the untiring, faithful and intelligent efforts of such men as the above mentioned. Let us as citizens of the great State and students of this worthy institution offer our most hearty congratulations and sincere gratitude for this most excellent work.

Current Comments Regarding Black Ruler

"As the grand champion bullock is a winner over all breeds, much interest was in evidence when Judge Walter Biggar of Scotland, began to work over the different contestants for the honor. Black Ruler, a pure bred Aberdeen Angus steer, bred, fed and fitted by the Indiana school, proved invincible and scored a convincing victory over the other steers shown. It is an interesting fact that not only was Black Ruler bred by Purdue University, but his dam was also. He is well night a perfect beef animal and was proclaimed by many who have seen many Internationals to be the best bullock that has even won grand championship honors." —Wallace's Farmer.

"The grand champion steer was found in Purdue University's Black Ruler, which is a pure-bred Angus senior yearling, bred by that institution. He defeated everything in his own breed classes, perhaps his closest competition appearing here in the form of a beautiful but hardly fat enough junior yearling shown by the University of Missouri. Then he beat the other breed and grade champions, though they were worthy competitors, and did it without any question about his supremacy even from the friends of the defeated ones. This steer more nearly approaches perfection than any other grand champion in the history of the show."—The National Stockman and Farmer.

"The grand championship seemed almost a foregone conclusion as soon as Purdue's champion pure-bred Aberdeen-Angus was led into the ring, although the supporters of Rosenberger's champion Shorthorn junior yearling Cloverleaf Jack were not at all sure but what his thickness of fleshing and notable weight for age would give him the edge. The decision was by all odds the tensest moment of the show. After a careful consideration of the remarkable type and smoothness of the steer, Mr. Biggar gave the award to the magnificent Black Ruler, with the reserve to the younger but heavier Shorthorn. Black Ruler possesses an evenness of

(Continued on page 180)

GREENHOUSE ON THE LEFT
NOTE FOUNDATION PLANTINGS
FARM BUILDINGS LIKE THESE
THIS TYPE IS CONVENIENT
MAKE FARM LIFE ATTRACTIVE
FARM SHOP IN THIS IMPLEMENT SHED
APPROVED OPEN FRONT
WELL LIGHTED HOG HOUSE
SEE LITTER CARRIER AND MANURE PIT

Purdue's International Livestock Judging Team

By Prof. B. E. Pontius.

IN competition with teams from twenty-one colleges in the United States and Canada, Purdue University's Livestock Judging Team won the premier honors of the 1920 INTERNATIONAL CONTEST. This is the second time that a Purdue team has won this contest in the last five years, no entry being made in 1918 owing to the war. G. G. Buford accompanied the team to the contest. These three men, and E. R. Bonham, H. W. Feldman, and L. F. Powell, deserve credit for their contribution to the winning team. They remained on the squad and worked hard until the final selection was made, furnishing the competition necessary to develop a winning team. Shortly after the victory was announced, one of these men said to me, "If I didn't make the team, I made very good judges of the men that did." Loyalty of this type is very commendable, and these men are given a share of the high honors won for their fine spirit and hard work.

Purdue's Winning Stock Judging Team. Standing—Prof. W. W. Smith, coach; J. M. Lilly, G. G. Buford, A. K. Mackey. Kneeling—M. P. Mitchell, H. R. Hofford, P. T. Brown, R. G. Fordice, G. L. Fisher.

The University was represented in the contest in 1900, the year the INTERNATIONAL was born, and again in 1901, after which no entry was made until 1913. Since then teams have been sent each year the Show has been held with but one exception. The data given below shows that a very creditable record has been made.

In 1913—Team placed 3rd
" 1916—Team placed 1st
" 1917—Team placed 7th
" 1919—Team placed 5th
" 1920—Team placed 1st

The 1920 winning team was composed of H. R. Hofford, M. P. Mitchell, P. T. Brown, G. L. Fisher and R. G. Fordice. Three alternates: J. M. Lily, A. K. Mackey and

It is a distinct honor to win a collegiate contest of such magnitude as the INTERNATIONAL STUDENTS' LIVESTOCK JUDGING CONTEST. Credit and praise are due the five men on Purdue's team for their splendid work which resulted in honors for the men and for the University which they represented. A great deal of the credit for winning belongs to the efficient and very thorough coach, Professor W. W. Smith, who

gave unsparingly of his time and energy to prepare the team for the big event.

The following data on the results of the contest will show better than anything else what the team did.

The Purdue team was:

First on Cattle
Second on Horses
Third on Hogs
Sixteenth on Sheep

The individual rating of each man on the team and his score out of a possible 1000 points was:

M. P. Mitchell, Second.....816 Points
H. R. Hofford, Seventh.....768 Points
P. T. Brown, Ninth.....764 Points
R. G. Fordice, Fifteenth.....750 Points
G. L. Fisher, Thirty-seventh.....698 Points

This shows that Purdue had three men in the ten highest men in the contest in which 105 students competed. W. B. Forrester, of Oklahoma, was high man of the contest with a score of 831 points.

The standing of the teams and their respective scores was:

Purdue	3796	Saskatchewan	3384
Nebraska	3705	Ontario	3349
Iowa	3653	Missouri	3286
Kansas	3581	West Virginia	3283
Minnesota	3506	Wisconsin	3277
Ohio	3494	Kentucky	3251
Colorado	3450	South Dakota	3004
Pennsylvania	3446	Syracuse	2914
Texas	3435	Mass.	2726
Oklahoma	3431	New Mexico	2607
MacDonald	3406		

Five Hundred Dollars ($500) in prize money contributed by the American Shorthorn, Angus and Hereford Breeders' Associations and the two Duroc-Jersey Associations was awarded. Of this amount the Purdue team won approximately Eighty-five Dollars ($85). Effort is being made to have more prize money contributed and it is to be hoped that a larger amount will be available next year.

Students in the School of Agriculture, especially those in animal husbandry, should realize the opportunity and significance of this contest. It is a kind of training that cannot be obtained in any other way, but the road that leads to it is not strewn with roses. Every man that "tries out" for the Judging Team does it at a considerable sacrifice. He does not receive any credit on his degree for the work he does, and it is necessary for him to do practically all of this work after school hours and during week-ends. But the value of this work to the student who is really interested in animal husbandry is sufficient to more than recompense him for the efforts demanded. The competition is keen enough to call forth the best efforts and ability the student possesses.

If rose bushes, blackberries or raspberries are infested with the rose scale, a small white scale insect, trim out and burn the badly infested canes during the winter, and in the early spring spray the bushes with winter strength lime sulphur.

Purdue Agriculturist Essay Contest

1. All contestants must be Vocational Students of Agriculture.

2. Essay must be written by the pupil without aid, except for suggestion of subject and citation of reference material.

3. The local contest is to be judged by the vocational teacher and two other judges to be appointed by the superintendent of the school.

4. The first prize essay in each department is eligible to compete in the state contest. The essay submitted to the state contest must be the original essay as submitted in the local contest without being re-written or altered in any way.

5. A prize will be given to each vocational department submitting a report of 100% enrollment in the local contest before Feb. 15, 1921. Said report to include the name of each pupil and the subject of his essay.

6. Manuscripts to be entered in the contest must reach our office not later than noon, April 10, 1921.

7. Manuscripts will be judged on originality, subject matter, neatness, and English.

8. All communications and manuscripts must be addressed to the Essay Contest Editor, Purdue Agriculturist, 317 Pearl Street, West Lafayette, Ind.

Why Purdue Needs More Money for Poultry Experimental Work

By Prof. A. G. Philips.

THERE are over twelve million hens in Indiana and the value of their products is over 45 millions of dollars annually, exclusive of what is raised on town lots. The hen is thus an economical asset to the state of Indiana. Each of the 216,361 farms in Indiana keep an average of about 55 hens, but the average egg production per hen is only 83 eggs per year. From 35 farm owners keeping records for Purdue of general poultry flocks of about 150 hens, the average egg production is about 120 eggs per hen.

These 35 farmers have increased the economic production of a nationally needed food and increased the profits to themselves. Every flock in Indiana, as a state and national problem, should and could be made to produce as much as these 35 farms. One farmer near Bedford, Indiana, due to recommendations given him by Purdue University, has increased his average egg production, per hen, from 115 to 166 eggs in the last four years. His labor income increased from $1.11 to $3.19 per hen.

There are between 40 and 50 million baby chicks hatched each year in Indiana. Twenty millions of these die and are a total loss, due to faulty methods of management. This loss can be greatly reduced. Hundreds of thousands of hens are kept each year which never pay their feed bill. Tuberculosis and fowl cholera are causing increased losses among the farm flocks each year. Fifty per cent of the farm hens are improperly housed. The elimination of only part of these problems would double the income from the poultry in this state.

As Indiana farms become smaller, land becomes more worn out and expensive; livestock production becomes more complicated and its profits questionable, the hen must be depended upon to produce more food.

As city population grows the opportunity for the commercial poultrymen becomes apparent. Proof of this is shown:

(a) By the increasing tendency to keep 500 hens where 100 used to be sufficient on the general farms.

(b) By the increasing number of commercial flocks of 1000 to 3500 hens.

(c) By the development of the baby chick hatcheries producing probably four million dollars worth of baby chicks each spring.

(d) By the increasing interest of farmers and business men in correct poultry management and education.

The Average Indiana Hen Produces 83 Eggs Per Year.

From true business farm management and economics this hen is usually unprofitable. She should either be eliminated or improved. The former is not economically sound. The later is necessary.

The Real Needs for Poultry Education in Indiana.

Due to the fact that the farmer of the past has not been compelled to give marked attention to his poultry, he has failed to study proper methods of management. He is, therefore, at sea about what he needs to do to make his hens more profitable, and he is appealing to Purdue for this help.

The three big fundamental problems he has to meet are breeding, feeding and management.

Breeding.

Today we are beginning to learn that a hen can be bred to lay and that she probably has some external characteristics that will help us to choose the proper fowl for breeding and laying. The farmer finds that culling out the poor from the good layers is a good sound business proposition in building up a machine that will run efficiently. There is more profit to him and to the state if he can put his feed into good layers only.

Our knowledge of the proper characteristics of a good bird is as yet circumscribed by lack of opportunity to study birds under different environments and where trapnests are used. The farmer cannot afford to experiment for himself or to use and handle trapnests or keep the necessary records. Record keeping of hundreds of birds and thousands of chicks, requires an immense amount of clerical labor. It is as much trouble to pedigree a hen's offspring as it is to keep a pedigree record of a calf, colt or pig. The Experiment Station must do this work

for the farmer and he is looking for the data and information that can be applied by him to his flock. He is also looking to the Experiment Station to produce certified pedigreed breeding males that are bred to lay and fit to mate with his birds and thus improve their future production.

Breeding is fundamental to any success with livestock. Only properly bred birds with an inherent tendency to lay can be made to lay when properly fed or handled. This, then, is the first problem of the Experiment Station Poultry Department. We must find the things that can be interpreted by the average farmer and put into practice by him.

In placing before him our present small knowledge of the proper selection of good hens, we find the farmer almost totally lacking the information but most eager to receive it and put it into practice.

Feeding.

Of the 134 flocks in 67 counties visited and culled by representatives of Purdue during August and September of 1920, only three flocks were found to be properly fed during the summer months. Fully half the flocks had never been fed anything except grain during the past year. This condition is another primary cause of the low production of poultry in the state. A good hen must be well fed in order to lay all that she has the power to produce.

We have found that animal protein is necessary in the ration of laying hens. We do not know all the kinds that can be efficiently and economically used, nor in what proportion they can best be fed. The underlying reasons for the good and bad results obtained under the different methods of feeding are not known and they must be determined before a practical application of any proper method can be recommended.

The causes of leg weakness and diarrhea in chicks, which are the direct causes of so much of the loss among baby chicks, is not known. This is a feeding and nutrition problem.

The proper method of feeding hens under artificial lights, which seems to be so necessary in securing winter eggs, is very debatable among all keepers of poultry, as is the most economical system of winter feeding of hens in large flocks, without causing a molt.

Only where different flocks of the same breeding, in the same environment and laying in trap nests, are being observed, can these problems be worked out. No farmer or producer can afford to do this for himself and if he did, no one else would be cognizant of the information obtained. The Experiment Station is the place for such work and its Extension force is the channel through which the data can be disseminated.

Management.

Business management and cost accounting on the farm is a necessity today. The cost of hatching a chick and of growing it, the cost of housing a hen and feeding it, the cost of labor, marketing and minor problems of management are all demanded of the experiment stations today by those keeping hens and particularly by those who plan to go into the business in a commercial or semi-commercial way.

Cost to the State of Indiana.

If every farmer would appropriate one egg from every hen on his farm to the Purdue Experiment Station Poultry Department, the income would amount to $400,000.00 annually. If but the equivalent of one-sixteenth of an egg per hen were given, the amount available would be $25,000. This would mean one egg per year for the town poultryman keeping 16 hens and 3.5 eggs per year for the farmer keeping 56 hens.

The Poultry Department Has Made Good with What It Has Had.

For eleven years the Poultry Department has struggled along on a State Experiment Station appropriation of $5,000 annually. With this they have established a small but efficient poultry experimental plant. In fact there is no other state in the Mississippi Valley as well equipped at this date as Purdue University. We have organized a line of feeding experiments the results of which have been put into practice by hundreds of farmers with known benefit and profit to them. While the extent of these experiments has been limited, what has been done has been well done and the quality of our work has a good reputation among Indiana poultrymen and those of other states.

Congress has appropriated $250,000 for use in the U. S. Army's project for encouraging farmers and stockmen in the breeding of horses.

The Dairy Judging Team's Trip

By Donald C. Badger, '21.

SUNDAY night, October 3rd, found Prof. L. H. Fairchild and his judging team, composed of J. F. Beldon, D. C. Badger, J. M. Hayward, and W. E. Walters, alternate, quartered in a Milwaukee hotel ready for one of the most interesting weeks of inspection that any of the students had ever taken. The trip was primarily for the purpose of visiting herds of dairy cattle in Wisconsin prior to the judging contest at the National Dairy Show at Chicago on October 9th; but in order that the scope of study might not be too narrowed, the team spent the following Monday morning in seeing what becomes of the product which dairymen produce on the farm. In accordance with this idea the inspection included the following named places in the order named:

The Dairy Judging Team. Prof. L. H. Fairchild, coach; J. F. Beldon, D. C. Badger, W. E. Walters, J. W. Hayward.

The Gridley Dairy Company, Milwaukee, Wis.

Only one of the milk plants of this company was visited. The arrangement of the plant, and the excellent machinery used leaves little to be desired, and can easily serve as a model plant in many respects. The greatest care is taken in putting out a high class grade of milk, and their system makes this uniform at all times. By their system they are able to handle some 6400 gallons of milk daily, and all the receiving, washing, and bottling is done in about seven hours. The volume of milk handled, the cleanliness, and the system were the very impressive features of this plant.

The Luick Ice Cream Company, Milwaukee, Wis.

This plant makes from 12,000 to 15,000 gallons of ice cream per day, containing about 14% fat and 75% overrun. All freezing is done in vertical freezers of Mr. Luick's own design, and the cream is packed in bricks and two gallon cans. Each day's freezing is stored in a separate cooling room and the shipments are always made from the room containing the oldest cream.

An ice plant is operated in connection with the ice cream business, and about 700 tons ice are made daily. This is all used for icing cabinets and supplying their city dealers.

Kuhtz Brothers—Guernseys, Waukesha, Wis.

At this herd we saw two splendid bulls which were superior to any others of the breed that we saw, for they had quality and refinement combined with good capacity and straightness of lines. At one of the brother's farms we saw the progeny of these bulls and judged three classes of cattle—cows, heifers in milk, and yearling heifers. In one class the Kuhtz brothers entered a three-teated cow which caused some discussion as to the merits of such an animal in the show ring. Needless to say, however, from then on udders were examined more carefully than any other one part of the animals.

C. E. Knight—Jerseys, Eagle, Wis.

Mr. and Mrs. Knight met us at the station with their Fords and took us immediately to their farm—a Jersey farm in the heart of a Holstein and Guernsey community. We were all impressed with the splendid arrangement of the barn at this farm and the uniformity of the animals. Time was the limiting factor here, so we could only judge two classes before catching a train back to Waukesha.

Aitken Brothers—Holsteins, Waukesha, Wis.

While the best individuals of this herd were out on the show circuit, the herdsman gave us a splendid class of mature cows. After the judging we were shown around the farm and had an opportunity to see a wonderfully equipped set of barns.

S. A. Baird—Holsteins, Waukesha, Wis.

We arrived at the S. A. Baird farm and judged one class of mature cows. While at work here, the Kansas team arrived and joined us in our work.

Carnation Condensery and Holstein Farm, Oconomowoc, Wis.

Mr. Ousterhuis, head of the educational branch of the Carnation company, met us at the condensary and spent considerable time showing us through the plant. Our only regret was that we could not see the factory in operation, since the plant was not then condensing. Hundreds of cases of condensed milk were seen in all stages of manufacture, however, and we were able to get some idea of how the work is carried on. A large amount of milk is now received daily, though, and made into butter; but the creamery comprises only a small portion of the factory.

At the Carnation farm we judged a class of cows and a class of bulls, then made a hasty study of the barn equipment and arrangement. The business is carried out on a mammoth scale, and we were impressed with the magnitude of it all.

Gustave Pabst—Holsteins (Hollyhock Farm), Dousman, Wis.

Mr. J. F. Southcott, manager of the Hollyhock farms, spared nothing in accommodating us, for his men were ready to bring out one class of cattle after another just as fast as we could judge them. His courtesy was surely appreciated, for we were able to work fast and to work on some splendid classes. It was here that we saw Sir Bess Ormsby Fobes, a $30,000 sire, possessing wonderful individuality.

Pabst Stock Farm—Holsteins, Oconomowoc, Wis.

Once more we had an opportunity of seeing the magnitude and possibilities of the dairy industry, for at this farm, owned by Mr. Fred Pabst, we saw some 475 head of Holsteins which are given the acme of care. The impressive feature of this farm was the wonderful capacity of the animals which, it seems, had been sacrificed for type and refinement. These animals were practically all descendants of King Pontiac Champion, and were all heavy producers. The herd averages over 40 pounds milk per head per day, and the total milk yield averages between 6000 and 8000 pounds per day.

Here we saw Pabst Korn Cornflower, the cow who has broken three world's records for her age; 38 pounds butter in 7 days; 256 pounds in 30 days, and 412 pounds in 90 days. Last spring she sold for $30,000.

In connection with the dairy there is also an up-to-date creamery where about 100 pounds butter is made every week for use on the farm. The balance of the butterfat is shipped daily to Milwaukee.

Corium Farm—Guernseys, Fond du Lac, Wis.

The Corium farm, owned by Mr. F. J. Rueping, proved to be the best equipped farm we visited; and it was an education to see what improvements science has wrought in labor-saving and time-saving devices for the modern dairy farm. Here was a barn

with a capacity of about 120 head including calves, and equipped with cork brick, Star stanchions and box stalls, individual drinking cups, electric lights and power machinery, and electric fans.

Here we also found the $17,700 cow, Imp. Rose de Houards, who has an excellent butterfat and show ring record; and the herd sire, Superb of Edgemoor, both splendid individuals and a credit to the breed.

B. F. Sheridan—Guernseys, Fond du Lac, Wis.

This was our opportunity of seeing the only certified milk plant on the trip, and Mr. Sheridan spent considerable time explaining his methods and the breeding of his cattle, as well as giving us a class of cows to judge.

F. K. Babcon—Guernseys, Hinsdale, Ill.

Here we found a Guernsey farm where type, refinement, and production are all combined to form a successful business enterprise. A mature cow on this farm must make at least 600 pounds butterfat per year to become a part of the herd, and every opportunity is given her to "toe the mark."

Tilden Farms—Guernseys, Delavan, Wis.

Mr. James H. Murphy, manager, piloted us over part of the 1630 acres known as the Tidlen Farms, and gave us an opportunity of seeing and judging some of the 350 head of Guernseys. Here again we received a conception of what can be done in the dairy industry and the possibilities of it. No greater education can be received than to make a study of such a farm and note the co-ordination between all kinds of livestock.

The National Dairy Show, Chicago, Ill.

The stage was all set; and after a week of hard work and preparation, during which time twenty-two classes of dairy cattle had been judged, the team entered the arena at the National Dairy Show ready to compete with the other twenty teams representing as many different agricultural colleges in the country. The twelve different classes brought out were exceptionally good and offered splendid opportunities for student judging. This work required a full day, at the end of which everyone waited, with considerable anticipation, the announcement of awards.

The next evening these awards were made to a representative group which received the announcements with some show of enthusiasm. The Purdue team succeeded in placing fourth among the 21 teams entered, being beaten by Kansas, Iowa and Kentucky, respectively. In individual honors, the prize for the best judge of all breeds went to a Kansas man, while the second prize for the same judging went to D. C. Badger, of Purdue.

Corn, But Not Corn Alone

By C. M. Vestal,
Associate in Animal Husbandry, Agricultural Experiment Station.

IN very recent years corn prices have at times reached such high levels that many feeders of the corn belt have used other feeds in the place of time honored corn. They have found awaiting their demands dozens of commercially mixed feeds, a few of which were offered at prices that rightly made them competitors of corn in some sections of the country, while on the other hand many of them were offered at exorbitant prices. Many farmers have bought these feeds regardless of their values, but with the conviction that they were justified in dodging $1.50 and $2.00 corn prices.

On account of this new and urgent demand from feeders and through the use of a surplus of by-products of food manufacture, resulting from war conditions, the feed manufacturers' business flourished through the years of high priced corn.

The year 1920 swings the feeding pendulum swiftly back to corn, as it ushers in a record crop with the prevailing market price below production costs. The feeder's problem is again that of getting the most out of the corn and the animals to which it is fed. The proprietary feeds will always have a place in the livestock feeding operations of the country, and real progress is being made by the best class of feed manufacturers, but their feeds will never substitute to any marked extent the grains and hays of our corn belt farms.

It is true that the average corn belt

farm is not completely balanced in the production of livestock rations. Even the best balanced livestock farms must turn to outside sources for supplementary feeds, usually for the purpose of adding sufficient protein, or other growth producing elements to the rations fed on the farms.

Wheat middlings, wheat bran, cottonseed meal, linseed meal, tankage, skim-milk and buttermilk are among the most important of the well known and widely used straight by-products that help to balance the livestock rations on the corn belt farms. All of these are classed as protein feeds and are bought to offset the common protein deficiencies of our home grown rations, rather than to replace them in any way. The securing of a sufficient and economical supply of protein feeds for balancing the corn ration is one of the most urgent problems of the swine feeders of the corn belt states at the present time. During the growing seasons forage crops, especially the legume crops, are helping more and more to solve this problem, the result being shown in cheaper production and better hogs. Even with the forage crops some concentrated protein feed is usually beneficial. Without the forage crop it is an essential. Few farmers have sufficient skim-milk or buttermilk to supply the protein needs of their hogs. Only enough tankage was available in Indiana last year to supply the needs of one-sixth of the hogs produced and the price of this feed remains high on account of the demand for it. The demand for matured soybeans for seeding purposes largely prohibits their use as a protein feed for hogs. Cottonseed meal is not to be generally recommended as a hog feed. Linseed meal is expensive, considering returns from it, and the once favored wheat middlings are now low grade and expensive.

A series of experiments have been started at the Purdue Experiment Station for the purpose of getting information on the feeding values of some high protein feeds that are comparatively new on the market. One trial has been completed in which fish meal, soybean oil meal, semi-solid buttermilk, and ground soybeans are compared with tankage and creamery buttermilk as protein supplements to corn for fattening hogs. These various protein supplements fed with corn were also composed with a ration of corn alone. The results condemn the practice of feeding corn alone. The ten hogs in each lot were started at an average weight of 107 pounds and were fed until they had gained an average of 120 pounds each. All were self-fed according to appetite, that is, they had their choice of shelled corn and the protein feed from separate compartments of a self-feeder. The semi-solid buttermilk and the buttermilk were fed twice daily in troughs while the shelled corn in these lots was fed in self-feeders.

A self-feeder is convenient in supplementing corn.

The results:

Buttermilk won, with an average daily gain of 2.14 pounds per hog at a cost of

$10.44 per hundred pounds, and it required only 56 days to get to market.

Fish meal was second. Average daily gain, 1.99 pounds; cost per cwt., $10.40; time, 61 days.

Soybean oilmeal was third. Average daily gain, 1.93 pounds; cost, $10.83; time, 62 days.

Tankage was fourth. Average daily gain, 1.76 pounds; cost, $11.64; time, 68 days.

Semi-solid buttermilk was fifth. Average daily gain, 1.65 pounds; cost, $12.70; time, 73 days.

Ground soybeans was sixth. Average daily gain, 1.41 pounds; cost, $13.58; time, 85 days.

Corn alone was last. Average daily gain, .97 pounds; cost, $15.28; time, 124 days (more than twice the time required by the hogs which had the better rations). Just now corn is not worth much, neither is the hog's time, but labor is costly and profit is essential. The corn belt farmer must feed corn but not corn alone.

Poultry Judging Team

A NEW field opened to the students in Poultry Husbandry when the organization of the Intercollegiate Judging contest was completed. The Seniors in Poultry Husbandry and the Poultry Department managed through correspondence to organize the contest (a thing they have had in mind for years) to take place Saturday, December 4, at the Coliseum Poultry Show in Chicago. The colleges entering teams in the contest were the University of Missouri, Iowa University, and Purdue University. Immediately the three colleges began work toward training a Judging team. With Prof. L. H. Schwartz of the Poultry Department as coach, eight men began to work for a place on the team. Meeting every afternoon and making many trips to nearby poultry breeders, a team was finally selected. This team was composed of W. W. Zurstadt, '21, of Evansville, Ind.; C. B. Bouton, '21, of Waukeegan, Ill.; Roy E. Roberts, '21, of Lafayette, Ind., and H. H. Kauffman, '22, of Dauberville, Pa.

Poultry Judging Team. H. H. Kauffman, C. B. Bouton, W. W. Zurstadt, R. E. Roberts, Prof. L. H. Schwartz, coach.

On Tuesday, November 30, these four men left for the contest, proceeding to Chicago by a roundabout way in order that

(Continued on page 182)

Fewer Indiana Farms

By Prof. O. G. Lloyd.

MANY persons will be alarmed to learn there are 10,361 fewer Indiana farms now than ten years ago. They believe it is an indication that farms are being abandoned and farming is being neglected and poorly done.

A reduction in the number of farms, however, is the inevitable result of an increase in the size of the farm. The average of farms of all sizes in 1910 was 102 compared with 107 acres in 1920. This increase of nearly 5 per cent approximately offsets the 5 per cent decrease in the number of farms.

The small farms surrounding the cities have probably increased in number. The cities have a large increase in population and an increased demand for truck crops. These perishable products are grown most profitably on small farms near the cities and it is probable the census will show a big increase in the number of farms of less than 20 acres in size.

The decrease in the number of farms has come from farms where general corn belt farming is practiced. Most of these farms are from 80 to 240 acres in size.

In 1910 there was a larger number of farms between 50 and 100 acres than any other size. It is probable many 80 acre farms have added either 40, 80, or 160 acres, in which case the 80 acre farm would become 120, 160, or 240 acres in size.

Were it not for important advantages of the larger farm compared to the smaller one, the advance in the price of land would have caused a decrease in the size of the farm. For it must be remembered that farm land advanced in price more than 100 per cent from 1910 to 1920. This big increase in the price of land causes land to be used more fully, thereby resulting in less land producing the same amount of products. Other forces, however, have more than offset the effect of the rise in the price of land and these forces will now be considered.

The national agricultural ideal, namely, the highest production per man, influences the way farming is done. Farmers are organizing their farms to get the largest profits per man rather than the largest profits per acre. If they can make larger profits by farming more acres than by farming a smaller number of acres, they choose the larger farms to get the largest profits per man, although the profits per acre might be a little less.

An interesting feature of this production per man ideal compared to highest production per acre is that both consumer and producer benefit from it. Farm products are produced more cheaply on the man than the acre basis. The acre basis uses land fully, but it wastes the other factors which enter into the cost of production. China utilizes land better than America, but it wastes labor to such an extent that the production per man is only a fraction of that obtained here.

Indiana farmers are adjusting the size of the farms to use improved machinery to better advantage. Man, horse and machinery labor comprises about three-fourths of the cost of producing farm products. There is a considerable investment in a full set of improved farm implements. The machinery expense per acre of crops is high unless there are a large number of acres to share the expense. The advantage of the machinery lies in the fact that one man accomplishes so much more in the same length of time if associated with power farming in lieu of his own strength unaided. The power used with this machinery may be a five-horse team or a tractor. One man's labor is saved if a four-horse team accomplishes twice the amount of work of a two-horse team. The expense per acre is high for horse labor if there are only a few crop acres. If a small number of horses is used per team on a small farm to lower the cost of horse labor then man labor per acre is high.

One of the most interesting features of an economic farm unit is that in most cases it should be a two-man farm. This conforms closely to the family size farm, the wife and children doing the work which is equivalent to a man's work. For general corn belt farming a two-man farm varies from 160 to 240 acres in size. A little extra labor may be needed at rush times, but the equivalent of two men should do most of the work.

Two men can do the work on a 200 acre farm more easily than one man can do the

work on an 80 acre farm of the same type of farming. The one man is a slave to his work. When he leaves the farm everything stops, while on the two-man farm there is one to keep the horses and machinery busy while the other goes to town. There are many jobs on the farm which require two men to do them economically.

The big change that is taking place in Indiana today is adding enough acreage to make a profitable two man or family size farm. On the average farm most of the work is done by the farmer and his family. It is very important that the farm acreage be sufficiently large to justify the most efficient use of man power. This can only be done by obtaining the greatest production per man through the use of labor saving machinery, whether it be done by a large team or by the farm tractor.

Control of Lice on Cattle, Hogs and Poultry

By Prof. J. J. Davis.

Cattle Lice.

CATTLE lice are injurious to all classes of cattle, causing losses by irritation, low vitality, increased death rate, etc., and in the case of dairy cows, by low production. When lice are introduced into a herd during the fall or winter they spread rapidly under indoor conditions, and early precautions should be taken to eradicate the pests. Sanitary and properly ventilated quarters are the first essentials in minimizing the chances of lice infestation. Once the animals become infested treatment is necessary.

Lousiness is indicated by restlessness of the animals or by their rubbing against posts and other objects due to the irritation. In bad cases the animals may be weak and unthrifty or areas of the skin may be bare, bruised or raw. In any event the final criterion of lousiness is the presence of the small slate-colored lice, usually on the head, neck, and shoulders, or of small reddish biting lice to be found feeding on the rough parts of the skin or on the hairs, usually on the withers and around the root of the tail.

Three methods of treatment are useful —hand applications, spraying, and dipping. The latter is recommended only for the larger herds, as a specially built dipping tank is necessary. Full details for constructing such a tank are given in Farmers' Bulletin 909, of the U. S. Department of Agriculture. Hand applications consist of dusting proprietary powders (sold under various trade names, and their effectiveness usually dependent upon their naphthalene and pyrethrum content), which are only partially effective but are useful during cold weather when spraying or dipping should be avoided. Any of the following mixtures, as well as any of the sprays recommended below, can be applied by hand with a brush or cloth, but if used during cold weather a small amount of oil only may be lightly brushed on the coat:

(1) Cottonseed oil and kerosene, equal parts.

(2) Kerosene ½ pint, and lard 1 pound.

(3) Crude petroleum.

Spraying infested cattle with a small spray pump, such as a hand bucket pump, is convenient and economical for small herds, and the material to be used may be any of the standard cattle dip preparations now on the market. These include arsenical dips, coal-tar creosote preparations, and nicotine dips. Two treatments should be given about 15 days apart, and if an arsenical dip is used care should be taken that neither the animal nor the operator breathes the spray.

All animals in a herd should be treated at the same time, and stables to be used for treated cattle should be thoroughly cleaned and disinfected. All manure and litter should be removed and the walls and floors sprayed with a coal-tar creosote dip, diluted as for treating the animals, or with kerosene and crude petroleum, one part of former to four of the latter.

Hog Lice.

Hog lice occur commonly throughout the State of Indiana and are as harmful to swine as the cattle lice are to all classes of cattle.

Cleanliness is of much importance, and the methods of caring for pens which have contained lousy hogs are the same as recommended in the case of cattle lice infested quarters.

The methods given above for treating infested cattle apply equally well for hogs.

Properly constructed wallows and dipping vats, in which the water is treated with a suitable louse remedy, are effective, the former being simple and economical, the latter economical when many hogs are to be treated. Full particulars relative to medicated wallows and dipping vats are given in Farmers' Bulletin 1085 of the U. S. Department of Agriculture.

Poultry Lice and Mites.

The presence of mites and lice not only affects the vigor and growth of poultry, but also reduces egg production, the quality of marketable poultry, and in the case of young chicks may even cause death.

The first essential in the control of lice and mites on poultry is proper housing as recommended by the Poultry Department of Purdue University. Simple, convenient construction which permits easy cleaning and treating, when necessary, is very desirable. Infested houses should be thoroughly cleared of all refuse and thoroughly sprayed with crude petroleum or carbolineum, care being taken to drive the spray into all cracks and similar concealing places. Painting the roosts with a creosote wood preservative after cleaning and spraying is recommended.

Commercial sodium fluorid, a powder which can be purchased at most drug stores, is thoroughly efficient in destroying poultry lice. The treatment must be thorough and application can be made as a dust or as a liquid, the former being preferable. By the dust method a small pinch of the powder is applied among the feathers next to the skin on the head, neck, back, breast, below the vent, on the tail and beneath each wing or elsewhere that lice occur.

As a dip it is used at the rate of 1 ounce of commercial or two-thirds of an ounce of chemically pure sodium fluoride to each gallon of water. The fowl should be thoroughly and completely dipped in this mixture, holding it by the wings and using one hand to ruffle the plumage to assist penetration of the insecticide.

The thorough cleaning of poultry houses as mentioned is effective against the common chicken mite, but for certain other less common kinds of mites attacking poultry, it is additionally necessary to treat the fowls. Effective control is secured by dusting with sulphur or dipping with a sulphur mixture, the former being preferable during cold weather. The dip used is a mixture of 4 ounces of sulphur, 2 ounces of soap and 1 gallons of water. The finest grade of flowers of sulphur should be used and any common yellow or resin soap containing the least amount of free alkali is satisfactory. In dipping the same method as when dipping with sodium fluoride, given above, should be used. In dusting, flowers of sulphur should be used and the dusting be thorough, care being taken to see that the dust gets in amongst the feathers and is evenly distributed. The sulphur dipping treatment is also applicable against other mites and lice, excepting the red mites.

Treatment of the entire flock during the late summer or early fall, when conditions are favorable for dipping, most of the young birds are well matured and a minimum number of fowls to treat, is the preferred time, but if the fall treatment has been neglected treatment should be given before brooding time in spring. During cold, windy weather dipping should be avoided but dusting can be done at any time.

For complete information on poultry lice and mites the reader should consult Farmers' Bulletin 801 of the U. S. Department of Agriculture.

KNOX COUNTY FARMER LIKES HOGGING-OFF PLAN

T. L. Meier, a Knox county farmer, kept exact records on hogs which were used to harvest a crop of corn and soybeans and then reported the results to County Agent W. J. Piggott, at Vincennes, and the township committee of the Knox County Farmers' Association which is co-operating in a big, county-wide program for improvement of hog feeding methods. Mr. Meier turned 76 hogs into the field, their average weight being 101½ pounds. When he took them out forty days later they weighed on an average 180 pounds per head, thus registering an average daily gain of one and three-fourths pounds.

"I think this is a fine way to feed hogs. They made an excellent gain considering the fact that they were thin pigs and not used to new corn," said Mr. Meier.

Of the counties in Indiana, Allen produces the most cattle, Steuben the most sheep, and Rush the greatest number of hogs.

Prevention of Poultry Diseases

THE average farmer does not give enough attention to the health of his chickens. This is no doubt due to the fact that the value of the individual bird is small as compared with the other animals of the farm, and the importance of disease in his poultry is not realized until there is an outbreak which affects a large number of his flock. At this stage much time and expense may be required to save the rest of the flock.

The best way in which to combat the diseases of poultry is to prevent their entrance into the flock rather than to try to treat the disease after it has gained a foothold. As a rule it does not pay to treat a sick bird unless it is one of more than ordinary value. Usually only those methods of treatment which can be applied to the flock as a whole are advisable.

There are two general methods of procedure which have to do with disease prevention. The first of these is in relation to the proper management of the flock. This consists in using good, healthy, vigorous breeding stock, housing the stock in clean, well-ventilated houses which are free from drafts, proper feeds and methods of feeding, and attention to general sanitary conditions. Proper management will produce birds of strong vitality and good health which will be less susceptible to disease than those whose vitality has been lowered due to improper care.

In addition to management there are those practices which are carried cut for the specific purpose of maintaining the health of the flock.

Care should be taken in adding new stock to the flock. Either the addition of breeding stock or the purchase of eggs for hatching offer a means for the introduction of disease. Eggs should be purchased only from those breeders whose flocks are known to be free from disease. All breeding stock purchased or any birds that are added to the flock should be kept isolated from the rest of the flock for at least three weeks and should be closely watched for any symptoms of disease.

No matter how great the precautions taken there is always a possibility of a disease gaining a foothold in the flock. To overcome this and so prevent the disease from affecting a large percentage of the flock, the birds must be kept under close observation. If the first birds to contract a disease are observed the chances of checking the disease are much better than if a large percentage of the flock is infected before any attempt is made to combat the disease. If a fatal disease once gains a foothold in a large number of the birds the losses will be heavy before the outbreak can be stopped.

When sick birds are recognized they should be removed immediately from the rest of the flock. When the nature of the ailment is known and it is not serious, it may pay to treat the individual bird. If the disease is contagious it is best to kill the bird. Even if cured it may still harbor the germ which caused the disease and so be a menace to the rest of the flock. Also the disease is apt to lower the vitality of the bird to such an extent that it will not be a profitable producer. There is also the possibility that it may be used as a breeder and in this way it will help to lower the vitality of the flock as a whole.

In case the nature of the disease is not known information regarding it may be obtained from the Agricultural Experiment Station. This will take some time, and in the meantime the following method may be followed, as it is necessary to act immediately. First remove the sick birds from the flock. Then thoroughly clean and disinfect the house, disinfect the drinking water and keep a close lookout for new cases. A good disinfectant to use is a 5% solution of formalin and this should be thoroughly applied to all parts of the house. The drinking water may be disinfected by adding to it a saturated stock solution of potassium permanganate in the proportion of two teaspoonfuls of the solution to ten quarts of water which will give the water a purple color.

Even though there is no disease present the house should be cleaned and disinfected at least twice a year. This will reduce the possibility of a serious outbreak of disease in the future.

Prof. H. W. Gregory, head of the Dairy Department, attended a meeting of Indiana manufacturers of dairy products, Tuesday, December 7, at Indianapolis.

The Rural Church and Work-a-day Service

By Prof. O. F. Hall.

THAT the supreme and distinctive mission of the Church is spiritual, I have no desire to question. The gathering together of people for praise, prayer and preaching is at once the peculiar and the dominant function of the Church, and however much I may stress other activities, I do not want to be understood as desiring that these should be substituted for or made a hindrance to the Church's services of worship. The Church is both by appointment and custom the guardian of spiritualities, and whatever else it does it must not neglect its primary and pre-eminent office.

But the fact that man lives not "by bread alone" does not cancel or even clash with the fact that bread is a daily necessity. Likewise, the fact that the Church exists primarily to minister to the souls of men need not and does not prevent the Church from serving the practical needs of men. The mere mention of colleges, hospitals, orphanages, social settlements, and other work-a-day institutions created and supported by the Church accentuates the ready and the effective response the Church has made to calls for practical service.

Strange as it may seem to many of us, there are, however, a considerable number of church men and women who will give freely of money and good-wishes to far-away church-supported colleges and hospitals who will give nothing but opposition to local programs of uplift and helpfulness. When pressed for a reason for not supporting in the name of the Church public health nurses, recreation buildings, young people's orchestras, entertaininment courses, boys' scout equipment, farmers' institutes, or similar agencies of service, these devout men and women frequently reply by saying with great emphasis that these activities are not of the Church, that the Church's one and only business is to look after the spiritual needs of the community. A representative of this type whom I asked for a contribution toward a fund to provide an outing to a group of over-worked and under-entertained boys expressed himself in these words: 'What our boys need is not more fun, but more spirituality; they are already too worldly-minded." A few weeks previously this same man gave liberally to a church hospital after hearing an address which pointed out that persons whose bodies are healed by the Church did not and could not remain indifferent to the spiritual program of the Church. Healing is good, but preventing ills that call for healing is infinitely better.

A professor in a college which draws its students in the main from the rural sections of the South recently asked his students to suggest remedies for strengthening the rural churches of their area. These young people answered frankly. Here are some of their replies: "Educate the preacher. Stop quarreling over forms and other non-essentials and get together doing something worth while. Build better houses and make it possible for the congregation to be comfortable. Build good roads leading to the churches. Stop damning the young people for trying to be happy. Move the churches away from the graveyards and open playgrounds around them. Teach folks how to sing. Let the preachers realize that most young people want to be good and do what is right. Have sermons on agriculture as well as on total depravity. Pay the preachers enough to enable them to buy a few books occasionally. Get a good man and keep him through the week as well as on Sundays. Make a program and stay with it. If your religion makes you look sad all the time, get another brand. Enlist the young people before all the old folks die out."

Because those who wrote these lines live in the South and had in mind conditions obtaining in that section of the country, let us not think these replies have no application to conditions in Indiana. There is great need in Indiana just now of trained leaders for our rural and village churches. Leaders who will direct all-the-year-round programs of week-day as well as Sunday activities. The surveys conducted by the Interchurch World Movement show that there are scores of townships in Indiana without a single resident minister and literally hundreds of churches whose doors are never open during the week, and that there is no attempt made to utilize the power and program of

religion in the promotion of better health, better schools, better homes, better farms, better roads, and better social and recreational activities.

Probably no one church ought to undertake at once to tackle all these problems; but surely every rural and village church in Indiana can give considerable attention to one or more of them. Even where there is no resident pastor the officers and members can work unitedly and effectively toward making their church community better in some definite way. An open country church which had never had more than one-fourth the time of a minister living several miles distant set itself the task under the leadership of a young farmer to provide a safe and satisfying social center for the young people of the community, and in doing this it became conscious of its power, and is today one of the strongest rural churches in Indiana, employing on a respectable salary a full time pastor and carrying out a program of far-reaching importance.

I am asked occasionally to suggest weekday activities for rural and village churches. I always hesitate to do this unless I know something of the conditions, needs, and capabilities of the community in which the questioner lives or has in mind. But it is always pertinent, I think, to say that the following are fitting and fruitful fields of service on the part of rural and village churches:

1. Using church building for any meeting whose object is individual or community uplift. I have no sympathy with the notion that church auditoriums should be used exclusively for services of worship.

2. Regular or occasional meetings of church members to consider how and to what extent the teachings of Christ and the Church can be applied to local problems and local needs. Not a dilettante discussion of the real versus the ideal, but a sane and serious effort to ascertain what Christians should do concerning the matter under discussion.

3. Arranging and carrying out a program of choice entertainment. Part of this entertainment should be provided by home talent—rare indeed is the community in which there is not considerable undiscovered and undeveloped talent—and part by outside talent. Such a program can always be made self-sustaining, and great is the need of it in every small community.

4. Some sort of a literary or study club. Too few good books are read these days, and well might the Church help supply this need. A minister whose success as a rural pastor is known from coast to coast states that he considers the most valuble single piece of work done by him was the starting of a study club among the young people of his community. The first year was devoted wholly to biographies of distinguished men and women, the second to great hymns, and the third to selected novels.

5. A wholesome and constructive social program for the young people. If the church has no basement, annex, or parish house, let the church people take turns at opening their homes for parties and social gatherings. Young people crave and young people should have frequent opportunities to get together for games and fellowship. Older people are not without similar needs, but it is next to imperative that young people of rural communities have a richer social life, and the Church should lead the way in its realization.

CHAMPION JUDGING TEAM OF MISSISSIPPI INSPECTS AG. SCHOOL.

The champion judging team of the State of Mississippi composed of boys from the boys' clubs of that state visited Purdue on Monday, December 6th. They inspected the various departments of the Agricultural school. The team attended the International Livestock Exposition in Chicago, and on the return trip are visiting a number of universities in this part of the country.

The next session of Congress will be watched with much interest by farmers. Through their organizations they are demanding much needed agricultural legislation.

The Gronna-Anderson bill on meat-packing legislation, the Capper-Volstead bill, which legalizes collective marketing of agricultural products, and the French Truth-in-Fabric bill will be of especial interest. There will doubtless be much opposition to the Nolan bill which imposes additional taxes on land.

Preservation of Meat

Suggestions Compiled by Elsie Richardson, '21.

ONE of the important problems of the country home at this time is the care of meat. Let our slogan be "More and Better Cured Meat in Every Farm Home in Indiana."

Following are some practical suggestions for the home curing of meat:

Kinds of Meat for Curing.

1. Meats which contain a reasonable amount of soft fat which in a measure overcomes the hardening effect of the salt and brine on muscle.
2. Avoid curing meat too young.
3. Light carcasses are best.

Condition of Meat.

1. To secure a good finished product, the meat must be sound and of excellent quality.
2. Avoid poorly bled, bruised or diseased carcasses.
3. Be careful not to store meat in rooms where gasoline, kerosene or paint is kept, as flesh absorbs odors easily.
4. Avoid meat from animals that were exhausted before killing. The meat is much harder to keep.

Thorough Cooling.

1. Meat should be thoroughly cooled before one attempts to cure it. Carcasses should hang twenty-four hours before cutting, then twenty-four more hours for further cooling.
2. If possible, kill during the winter when alternate freezing and thawing is not apt to take place.

Vessels for Curing.

A clean, hard wood barrel is a suitable vessel in which to cure meat, but a large stone jar is the best vessel that can be had.

Recipes for Curing.

Method of Drying Beef:

This is a desirable form in which to preserve some of the meat supply. The hind quarter of a lean animal is best for this purpose. Carve out the large muscles without cutting across them.

For each 100 pounds of meat make a mixture of:

5 pounds salt
3 pounds sugar
2 ounces salt petre

After rubbing one-third of this mixture into all surfaces of the meat, pack the meat into a barrel. After a period of three days, take out, rub with another third of the mixture and repack, putting at the bottom the pieces which were formerly on the top. Do not remove the liquid that has formed in the barrel.

After another period of three days, repeat the process, and leave for three more days. Then take out the meat, drain for a day, smoke it and hang it up to dry, covering it with a cloth to keep off the dirt. When wished for use, cut it very thinly across the grain.

Corned Beef.

The tough cuts of meat can be used successfully. Cut the meat into uniform sized pieces. Pack these pieces in salt into a water-tight receptacle, using eight pounds of salt for each 100 pounds of meat.

After about ten or twelve hours, add to the meat and salt a brine composed of the following:

2 ounces baking soda
4 ounces salt petre
4 gallons water

If this mixture does not cover the meat, add more water. Put a weight on the meat to keep it beneath the brine. Keep the meat in the brine in a cool place until ready for use. Watch the brine closely; if it looks thick or ropy pour it off, wash the meat and repack it in new brine.

Hams and Bacon.

Dry Cure.

(for 100 lbs. of pork).

Salt	10 lbs.
Brown sugar	4 lbs.
Black pepper	8 oz.
Cayenne pepper	1 oz.
Salt petre	4 oz.

Brine Cure.

(for 100 lbs. of pork).

Water	4 gal.
Salt	8 lbs.
Sugar	4 lbs.
Salt petre	2 oz.
Red pepper	1 oz.

(Continued on page 176)

THE PURDUE AGRICULTURIST

Published monthly during the school year, by Agricultural Students of Purdue University, LaFayette, Indiana.

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The purpose of THE PURDUE AGRICULTURIST is to disseminate the latest scientific knowledge concerning Agriculture and Home Economics, to incite the young people of Indiana to a greater desire for training in Agriculture and in the industrial pursuits, to publish matters of interest concerning the Purdue School of Agriculture and the Purdue Experiment Station, and to afford opportunity to the students for training in Agricultural journalism.

THE NEW YEAR.

The New Year, announced by midnight bells, is being ushered in, while the Old Year makes his exit. It is time for the proverbial turning of the new leaf. But before doing this it is well that we review with the most careful scrutiny the record written there. It is a very interesting story no doubt—this record of our past year. Successes and failures can both be found there, and a careful study of their underlying causes will prove very instructive. Benjamin Franklin is said to have recorded his failures in a book which he studied diligently with a view to avoiding them in the future. There are a great many valuable lessons to be learned by a thorough study such as indicated.

But do not stop with that; go ahead and turn the new leaf and consider the unwritten page upon which you are so soon to begin writing. What are you going to write thereon? No man can accomplish much without a definite aim and purpose. So if you want this to be the biggest and best year of your life, aim at some objective and concentrate your efforts upon attaining it. Sit down and deliberately write out a plan for the entire year. List the big things you wish to accomplish. Perhaps you've often dreamed of some day liming the farm or part of it. Put that on your list. Have you often thought of draining that flat area in the nearby field? Don't put it off longer. Maybe you cherish an ambition to some day breed pure bred stock. Why not put it down on your plan and then aim towards its realization with all your might?

This is the New Year—your year of opportunity. Study the past; map out a definite plan for improvement; aim at the big things; never say fail. And may 1921 be your biggest and best.

PURDUE NEEDS HELP.

The Station is being called upon by farmers as never before to solve new problems not only affecting cost of production but storage, distribution and marketing, etc. The solution of these problems is vital to the welfare of producers and consumers and in fact every citizen of the state.

The biggest business of the state is education; it has suffered from war conditions more than any other business because its product is not sold for dollars—to be returned for its support. But even though its intrinsic value can not be measured specifically according to monetary standards, Purdue University stands out to the people of Indiana as an asset—not a liability. The money spent for its maintenance is an investment that will be returned to the commonwealth many fold, whether in the form of trained leaders in every phase of industrial and business activity, or in the form of results of scientific research by which practice in agriculture, industry and public

service is improved. Purdue pours out upon the state a steady stream of trained men and women who are absorbed in the industrial life of the state, its public utilities, its farms and its homes, whose influence and contribution to the public welfare is incalculable. The Experiment Station and the Extension Department have done that for agriculture which puts Indiana in the front rank among the states. It is no accident that Indiana corn growers, dairy men, stock breeders, and horticulturists are among the foremost in these fields. The application of the results of the investigations of the Purdue Experiment Station on Indiana farms has resulted in increased production and wealth and profits that have amounted to many times the total cost of maintaining the station. The influence of the Purdue School of Agriculture in Indiana is reflected in the remarkable showing at the 1920 International Livestock, and Hay and Grain Shows at Chicago, where Indiana exhibitors and Purdue carried off the premier honors of the shows, and established a record which no state has even come near equalling—a group of awards including half of the six most coveted prizes of the livestock show, and practically a clean sweep in the corn classes together with first in the Intercollegiate judging contest and fourth in the junior judging contest. The national reputation of Purdue has been emphasized recently by visits of ten stock judging teams representing as many universities, in preparation for the International, and the inspection by two hundred members of the Arkansas legislature, who made the long trip to Lafayette to gain ideas for the betterment of their home institutions.

But in spite of phenomenal growth and standing, the income for the school, never sufficient to meet the needs of a growing institution, has been cut in half in its purchasing power. The staff of scientific teachers and investigators is demoralized by the seduction of business opportunities at greatly increased salaries. Students, under the impulse of the experience of war, which has taught the value of technical education, throng the campus and fill every corner of the buildings to overflowing. In order to properly provide buildings, to maintain the necessary equipment, to retain the members of the teaching staff, President Stone has submitted the following budget to the Board of Trustees for the support of the University proper as an educational institution:

I. Capital Expenditures.

Buildings—	
School of Agriculture	$ 100.000
Home Economics	200,000
Addition to Chemistry	100,000
Recitation Hall	200,000
Schools of Engineering	250,000
Equipment—For all departments	100,000
Land—Option on land	50,000
	$1,000,000
Distributed over three years	$ 333,333

II. Current Annual Expenditures.

For salary budget	$ 100,000
For Maintenance	50,000
For Research	15,000
For Expansion	100,000
Total addition to present annual budget	$ 598,333

The Agricultural Experiment Station Advisory Committee, composed of farmers representing organized agriculture, has recommended to the board of trustees a minimum annual appropriation of $275,000 for the Experiment Station, and $250,000 for lands, buildings, etc., for that department, and the trustees have approved this recommendation.

With the present deficiency of funds, a retrenchment policy must be followed, meaning a reduction in the number of students, and the amount of work done in investigation. The attitude of the people of Indiana as expressed in this session of the legislature will determine whether so valuable an institution as Purdue shall be utilized to the utmost; whether its practical service shall be suspended; whether as an investment, its efficiency shall be increased or diminished. This is a critical time in the history of the institution and in the educatonal policy of the state. The demands upon the people are great, but a distinction must be made between those things which are essential to the laws of development and welfare of the commonwealth. Nourishment is the last thing to be cut off if we expect the state to stand and the welfare of its people to be maintained.

In the United States, Texas produces the most cattle, Iowa the most hogs, and Idaho the greatest number of sheep.

PURDUE'S JUDGING TEAMS.

Purdue has been represented this fall by four judging teams, three of which are pictured in this issue. These teams have all made creditable showings, the best being the victory of the Livestock Judging Team at the recent International in competition with twenty other teams. Purdue has won this contest twice, and a third victory entitles us to keep the bronze trophy permanently. Texas has also won twice and is therefore our closest rival.

The judging team is an activity of growing importance in the Ag. school. From obscurity it has emerged into the limelight and is now regarded as one of the important Senior activities. The team of 1916 was the first to engrave the name of Purdue upon this trophy; the 1920 team has again turned the trick. And now comes as a challenge to the next year's team the opportunity of clinching these previous triumphs and making the coveted prize ours permanently.

But such a task is not to be undertaken lightly. It involves a rather heavy financial outlay upon the part of each man who makes the team. Social activities will have to be reduced to the minimum, and the strictest mental application will be required. Class work and grades will suffer and inconveniences will be encountered. It is a man's job and must be approached as such. We wish to express our earnest hope that next year's team will show "the mettle of its pasture" by winning for Purdue a clear title to the handsome bronze trophy now on exhibition in the hall of the Ag. Building.

WELCOME.

Annually Purdue's doors are thrown open to the farmer folks of Indiana. First come the Short Course people, who spend a week listening to live discussions and practical demonstrations of various farm methods. Next come the Winter Course men who stay eight weeks. To these sojourners in our midst we extend our heartiest welcome. Purdue greets you. During the time you are here, be one of us. Learn to know Purdue and then go back home boosting the University and the cause of better agriculture. Welcome to our campus.

A NEW FEATURE.

In order to more thoroughly and efficiently assist our readers in the solution of their problems, we are setting aside each month one page to be devoted to the answering of inquiries. If you have any questions of interest to our readers, send them in. Sign full name to all communications, as no others will be considered.

Alumni and Local

STUDENTS' POULTRY SHOW.

The Junior Poultry Show which is held each year by the Juniors specializing in Poultry Husbandry was staged at the Dairy Judging Pavilion Saturday, December 18.

A great deal of interest was manifested in the show this year due to the fact that a contest was held between the Juniors and Seniors. Ten classes of four birds each were selected from the stock at the Purdue Poultry Farm. Two birds of each class were picked by the Juniors and two by the Seniors. The birds were judged by Mr. Carrick of the Extension Department. Ribbons were awarded on each entry. The Seniors won the contest, and as specified in the rules of the contest, they will be the guests at a theatre party to be given by the Juniors in the near future.

In addition to winning the contest the Seniors carried off all the sweepstakes awarded. Kuo won first place in individual honors, C. B. Bouton won the sweepstakes offered for the best female with a White Wyandotte pullet and Roy E. Roberts won the sweepstakes offered for the best male with a White Rock cockerel.

As a sideline to the show the Juniors and Seniors judged a class of White Leghorn hens and a class of Barred Rock hens for egg production. The Juniors won this contest, while Kuo of the Seniors carried off individual honors.

TROPHY ARRIVES O. K.

The trophy won by the Purdue judging team arrived O. K. and it surely is a beauty and looks well here. This trophy will be permanently awarded to the school winning the judging contest for three years. This is its second trip to Purdue. May it remain here. The class of '22 will please keep up the good work started by the class of '17 and continued by '21.

THE TRACTOR SHORT COURSES.

Excellent opportunity is being offered for those interested in better operation of tractors, or other power units, to spend a profitable period of actual work in repair, adjustment, and operation under the direction of competent instructors of the Mechanics Department of the Agricultural School. Twelve tractors of latest models, a number of stationary engines, tractor motors so mounted as to facilitate study of all parts, and repair equipment constitute the apparatus that will make the course extremely practical.

As only a limited number can be accommodated at this school, the course is repeated twice, thus giving those who make application for one term, and who can not be accommodated a chance to apply and enroll in one of the other two terms. The date of the first is from January 31 to February 12, the second from February 14 to February 26, and the last from February 28 to March 11. A small catalog of the school has been issued by the Department.

PURDUE UNION.

The Purdue Union drive is a success and the building is a reality in the very near future. This statement is backed up by the fact that to date $700,000 has been received. The students have done their bit as is shown by the $326,000 subscription. Come on, alumni, put the drive far over the top.

PURDUE EGGS WIN BLUE RIBBON.

The Poultry Department has received word that Purdue took first on each of its two entries at the National Egg Show which was held November 23 to 28 in conjunction with the heart of American Poultry Show at Kansas City, Mo. Purdue entered eggs in the single comb white Leghorn and single comb Rhode Island Red classes, and each entry scored 98½%.

HOOF AND HORN SMOKER.

The Hoof and Horn Club held a smoker and open house at the Sigma Chi house Wednesday, December 8, at 7:30, to celebrate the winning of Purdue at the 1920 International. It was well attended by junior and senior animal husbandry men, and also faculty and extension men from this department.

INDIANA CATTLE FEEDERS HOLD ANNUAL FALL CONVENTION.

The annual fall meeting of the Indiana Cattle Feeders' Association was held here Saturday, December 18. In the absence of President C. C. Fisher, of Union City, Vice-President Bennett Taylor, of LaFayette, presided. He opened the convention with a short talk, indicating the general trend of the cattle feeding business. After Prof. F. G. King, of the Station, had presented an outline of the cattle feeding experiment just being started at the University farm, the feeders inspected the cattle in the feed lots.

Mr. J. T. Alexander, of Chicago, and Mr. J. S. Taylor, of Indianapolis, both speakers on the afternoon program, were unable to attend and their papers were read by Prof. F. G. King. A comprehensive report of a survey now being conducted in eastern Indiana on the cost of beef production was given by Mr. M. H. Overton, of the Extension Department. The next talk was by Mr. Kay Wood, of Chicago, on "The Cattle Feeder's Problem," a discussion of the present economic situation. Dean Skinner concluded the program with a brief talk on the history, work, and advantages of the Cattle Feeders' organization. The following officers were elected:

President, Bennett Taylor, of LaFayette.

Vice-President, R. C. Morgan of Knightstown.

Secretary-Treasurer, Prof. F. G. King, of LaFayette.

Vice-President of north district, John Parkinson, of Rensselaer.

Vice-President of east district, W. M. McClure, of Union City.

Vice-President of south district, J. W. Raub, of Ellettsville.

Vice-President of west district, Ben Henderson, of Fowler.

Vice-President of central district Paul Silverthorn, of Rossville.

Director to Indiana Livestock Breeders' Association, C. L. Meharry, of Attica.

Alpha Zeta recently honored the following men by initiating them:

Gilbert Thomas	M. S. Smith
W. S. Oberlin	F. C. Stevenson
L. F. Powell	R. E. Roberts
L. G. Gordner	Orva Bugh
D. C. Badger	G. H. Williams

Books, Papers, and Magazines in the Farm Home

By Mary S. Lyle, '21.

LIFE is so strenuous in these days and each individual is trying to crowd so much into so short a space that time is lacking for contemplative reading. It is true that a man or woman may be intelligent without doing a vast amount of reading, but a reading community is almost always progressive, and a reading farmer the most influential. Along with reading go good music, artistic expression and cheerfulness and brightness of atmosphere. The reason for this is that the many ideas obtained from the reading of the best magazines, stories, and current history, must crystallize in action and keep the minds of the members of the family busy with other things than petty grievances, neighborhood gossip, and small personal annoyances.

The children need the best reading. There will be some time when the children, tired of play, turn to some other form of enjoyment. Good reading stimulates good thinking and promotes educational ambition. Considerable attention should be paid to the kind of literature the children read and the kind of illustrations that they see, for these influence deeply the plastic minds of these little ones.

Besides these reasons there remains the fact that it is good business to be well informed on the business or profession which is being pursued. It is good business to understand the principles underlying every process carried on on the farm and in the home and to be intelligent on all development being made along these lines.

It is good citizenship to be well informed on current history and social conditions in community and nation.

What shall the farmer and his family read?

GOOD PERIODICALS. One or more good farm journals, a good household magazine, a live general magazine, a good juvenile magazine for the children, and a good live church paper. A list of good periodicals for the farm home with their publication address and subscription price is given at the end of this article.

GOOD BOOKS. Gradually accumulate a collection of books chosen carefully. It is not necessary to buy a library all at once, but it is splendid to build up a worth while library of well chosen books. Do not buy a series of books or one book by subscription. They are seldom worth while and usually quite expensive. Neither is it wise to purchase many complete sets of books such as all the books of Thackeray or Hawthorne. It is better to choose the best from these authors. The names of a number of good books for grown-ups, and boys and girls, too, are appended.

A daily paper should be in each farm home; one that is well edited and if possible non-partisan. This is an essential in keeping one advised of the markets, politics and current history.

Good Magazines for the Farm Home.

Bookman, George H. Doran Co., 244 Madison Ave., N. Y. $4.00 per year. A monthly magazine on literary and social topics.

Century, Century Co., 53 Fourth Ave., N. Y. $4.00 per year. A high class monthly periodical of fiction, poetry and political and social literature.

Country Life, Doubleday, Page & Co., Garden City, N. Y. $5.00 per year. A beautifully illustrated monthly magazine of sport and art.

Country Gentleman, Curtis Publishing Co., Independence Square, Philadelphia, Pa. $1.00 per year. A good farm journal.

Delineator, Butterick Pub. Co., Spring and Macdougal Sts., N. Y. $2.50 per year. Household magazine.

Good Housekeeping Magazine, International Magazine Co., 119 W. 40th St., N. Y. $3.00 per year. Fiction and household magazine.

House Beautiful, House Beautiful Pub. Co., 8 Arlington St., Boston, Mass. $4.00. Artistic homes and furnishings are illustrated.

House and Garden, Conde Nast & Co., 19 W. 44th St., N. Y. $3.50. Artistic house plans, landscape gardening and arts.

Journal of Home Economics, The American Home Economics Association, Baltimore, Md. $2.00. Articles on textiles and foods and new methods in home making.

Ladies' Home Journal, Curtis Pub. Co., Philadelphia, Pa. $2.00 per year. Fiction and household magazine.

Literary Digest, Funk & Wagnalls Co., 354-360 Fourth Ave., N. Y. $4.00 per year. Sums up for hurried readers the happenings and thought of the world for every week.

North American Review, North American Review Corporation, 9 E. 37th St., N. Y. $5.00.

American Review of Reviews, Review of Reviews Co., 30 Irving Place, N. Y. City. $4.00. Literary, political and social reviews of the day.

Scribner's Magazine, Chas. Scribner's Sons, 597-599 Fifth Ave., New York City. $4.00. High class general periodical.

System on the Farm, A. W. Shaw Co., Cass, Huron and Erie Sts., Chicago, Ill. $2.00. Good farm paper.

Woman's Home Companion, Crowell Pub. Co., Springfield, O. $2.00. General household magazine.

St. Nicholas Magazine, 353 Fourth Ave., N. Y. City. $4.00. Splendid children's magazine.

Atlantic Monthly, Atlantic Monthly Co., 8 Arlington St., Boston, Mass. $5.00. High class literary monthly.

American Boy. A good magazine for boys.

National Geographic Magazine, National Geographic Society, Hubbard Memorial Hall, Washington, D. C. $4.00. Splendidly illustrated articles on various countries.

Books for All.

The Turmoil, Booth Tarkington. Story of modern life in a great city.

Penrod, Booth Tarkington. Boy life in an American town.

The Four Million, and Roads of Destiny, O. Henry. Good short stories.

Home Fires in France, and the Day of Glory, Dorothy Canfield.

The Bent Twig, Dorothy Canfield. Story of an interesting American girl through her college life.

The Call of the Wild, Jack London. Good dog story.

The Rise of Silas Lapham, W. D. Howells. Good story of real American family life.

Humoresque, Fannie Hurst.

Treasure Island, R. L. Stevenson. Story of pirates and adventure.

Boy's Life of Theodore Roosevelt. Well written and entertaining.

Freckles, Gene Stratton-Porter. Good story and understanding representation of nature.

American Boy's Engineering Book, A. R. Bond.

The Promised Land, Mary Antin. An immigrant who became a real American citizen.

What Men Live By, R. C. Cabot. Thoughtful and interesting book.

Household Engineering, Christine Frederick.

The Home Book of Verse, Burton Stevenson. Collection of the best poetry of all times.

Poems, James Whitcomb Riley.

Lippincott's Manuals on Orcharding, Vegetable Growing, Horse Husbandry, Swine Husbandry, Dairying and the Home, and many others equally good.

AG. SOCIETY MEMBERSHIP NEAR 100% MARK.

As a result of the memberhsip drive conducted by the Purdue Agricultural Society, the entire Agricultural school closely approached the 100% mark as to Ag. Society membership. The drive was conducted in the form of a contest between the Senior and Freshman classes and the Junior and Sophomore classes. The former combination proved to be the better one with the result that the losing Junior-Soph. crowd will entertain with a program and eats at the next Ag. Society meeting.

Dean J. H. Skinner, of the Agricultural School, attended a meeting of the American Farm Bureau Federation at Indianapolis December 6, 7 and 8.

The entire University was deeply grieved at the death of Thomas Cooper Walker, '21, a senior in the School of Agriculture. Mr. Walker was a member of the Sigma Phi Epsilon fraternity and was a student and man of the highest order. His illness was short, and he died of pneumonia on Monday, November 29. He leaves a host of friends in the persons of his classmates and associates.

Dairymen, prepare to harvest your own ice this winter and thus save an ice bill.

The Indiana Apple Show

"A DISPLAY of the best fruit ever gotten together in Indiana" is not an exaggeration when applied to the Tenth Indiana Apple Show, held at Indianapolis, November 15 to 20. Although little attention was paid to any but standard varieties, such as Stayman, Grimes, Jonathan, Rome Beauty, and Ben Davis, the fruit of these varieties on exhibit was of high quality, good size and very well colored.

The exhibit was held at the Women's Building at the State Fair Grounds, which afforded a very spacious show room. Practically all of the large amount of space available was occupied by the fruit or by the displays of dealers in horticultural machinery and supplies.

The show was open to all surrounding Central Western States, but Ohio and Pennsylvania were the only ones besides Indiana from which fruit was received. The only big prize going out of Indiana was the special prize for Delicious, offered by Stark Bros. Nursery, of Louisiana, Mo., which went to Mr. Heacock, of Pennsylvania.

The large amount of fruit on exhibit may be realized from the fact that there were five growers showing in the 100 tray class and five in the Commercial class in which the exhibit consists of five barrels, ten standard boxes and ten bushel baskets.

Coffing Bros., of Silverwood, carried off most of the high honors including sweepstakes, winning first in nearly every event entered. The judge of the show was J. H. Gourley, Dean of Horticulture at West Virginia Agricultural College. Prof. Gourley expressed himself as being very favorably impressed with the merit of the fruit exhibited.

The State Horticultural Society held its regular business meeting and re-elected the officers who served the preceding term. The officers are L. V. Doud, Denver, President; J. B. Hamer, Vice-President, and H. H. Swaim, South Bend, Secretary-Treasurer.

The Indiana Fruit Growers' Association also held a meeting during the show and elected the following officers: B. W. Douglas, Trevlac, President; Clarence Bowers, Salem, Vice-President, and A. H. Blank, Indianapolis, Secretary-Treasurer.

Boys' Potato Club Work

By F. C. Gaylord
of the Horticultural Extension Department.

MORE than two hundred boys doing potato club work in all parts of the state have just finished demonstrating to their "Dads" that they are right there when it comes to growing big crops of "spuds." Of the two hundred boys reporting, only two reported yields of less than a hundred bushels per acre, while most of them secured a much greater amount. Even with high priced seed and low selling prices only a bare half-dozen of the two hundred grew the crop at a loss.

All this was possible through the splendid cooperation of Prof. Z. M. Smith and his Club Division, for to them must go a large part of the credit of organizing and pushing the club work in every part of the state. It has long been felt that potato club work offered a splendid field for the vocational teacher and club leaders, with proper aid from Purdue, to show the farmers of Indiana that potatoes could be made a profitable crop. Because of the small amount of money necessary, the shortness of the period over which the project ran and the excellent market, this project stood out prominently.

Early last year the Horticultural Division of the Extension Department outlined a single year and a four-year potato growing project by which boys under vocational teachers and club leaders could follow out the commercial practices, which during the past three years have doubled the potato yields on many demonstration farms throughout the state. In this course all the essential points in growing a big crop such as proper varieties, good selected seed, seed treatment, green sprouting, fertilization and other cultural practices were discussed in class and followed during the growing season under the personal supervision of the vocational teacher. A member of the Horticultural Division spent several weeks giving

(Continued on page 184)

ARCADIAN
Sulphate of Ammonia

Quick Availability

Questions are sometimes asked regarding the speed of nitrification, or of the availability of *Sulphate of Ammonia.* Some, who have had no practical experience with this chemical, have been under the impression that the ammonia does not become available quickly enough for ammonia salts to be valuable for side dressing purposes, and that in the mixed fertilizer they should be used only in connection with nitrate salts.

To show the fallacy of such ideas, we present the conclusions given in "The Book of the Rothamsted Experiments" (1917) by A. D. Hall, late director of the Rothamsted Experimental Station, England:

> "If the results obtained on the drainage water from the manured plots be examined, it will be seen that nitrification of manure like ammonium salts is extremely rapid; if there is any percolation, nitrates begin to appear in the drainage water immediately after the application of manure. Even in autumn an application of ammonium salts is converted into nitrate in a very short time, ****".
>
> "On October 25th of that year, mixed ammonium salts were applied to plot 15 and plowed in. Heavy rain followed, so that on October 27th the drain beneath the plot was running. It will be noticed that in the first runnings, ammonia was to be found. This is a very exceptional occurrence, but the large excess in which the chlorine was present in the water showed that the decomposition of the ammonium chloride and the retention of the ammonia by the soil had progressed considerably. Nitrification had also set in, since the earliest running continued nearly twice as much nitric nitrogen as was found in the sample taken a fortnight before the application of the manure. The proportion of nitrate continued to increase, and reached its maximum in the discharge three weeks later, by which time the nitrification of the ammonium salts must have been far advanced towards completion." (pages 233-234).

The nitrification of *Sulphate of Ammonia* is brought about by the same conditions of warmth and moisture that cause plant growth. The ammonia being held by the soil thus serves as a reservoir of plant food which is given up slightly ahead of the demands of the plant, a circumstance which assures an abundance of plant food with but little loss.

In the United States, Dr. Chas. D. Woods, director of the Maine Experiment Station, believing that *Sulphate of Ammonia* was not quickly available enough for the potatoes growing in the cold, late soils of Maine, undertook some experiments to prove that nitrates were necessary in the fertilizer. The results were entirely contrary to his expectations, however, and his conclusions are as follows:

> "As the results for the five years tell the same story each year, the experiment will not be continued farther. In two of these years the seasons have been cold, and as unfavorable to bacterial action as is likely to occur. The supposed quicker acting nitrate of soda gave no better yields in those cold, unfavorable seasons than was had with *Sulphate of Ammonia* as the source of nitrogen." (Bulletin 277 Maine.)

In the light of such experimental results, and in view of the fact that farmers all over the world are using satisfactorily *Sulphate of Ammonia* as the side-dressing or top-dressing fertilizer where quick action is demanded, we feel justified in stating that the ammonia of *Sulphate of Ammonia* becomes available quickly enough for all crop demands regardless of seasonal conditions.

For information as to application of Arcadian Sulphate of Ammonia, write Desk No. 16.

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AGRICULTURAL DEPARTMENT, NEW YORK.

The Codling Moth, or Apple Worm

By D. Parker, '22.

THE codling moth, or apple worm, is by all odds the most generally destructive orchard insect. It is a native of southeastern Europe, but has now become nearly cosmopolitan in its distribution, occurring in practically all the apple growing sections of the world. It was introduced into the eastern United States more than 170 years ago and by 1874 it had spread from coast to coast. It was first observed in Indiana about 1850 and for the past fifty years has been our most important apple pest.

The losses sustained in this state in unprotected orchards ranges from 40 to 100 per cent. of the crop. An idea of the destructiveness of this insect can be obtained from an estimate made by Quaintance in 1909, who figures the loss from the ravages of the codling moth at $16,000,000, three-fourths being direct injury to the crop, and one-fourth the cost of spraying and spray materials.

Because of its universal distribution the producer and the consumer are very familiar with apple worm injury. When an apple is encountered that is tunneled by cavities, partially filled with a brown and black frass often held together with strands of silk, one may be very sure that the cause of this was the codling moth larva. Many of the immature apples that fall during the summer are infested with the larvae, the result of the work of the first brood, while wormy apples that hang on the tree to maturity are often the result of infestation by the second brood.

About 90 per cent. pass the winter in the larval stage in a tough silken cocoon, the other 10 per cent. hibernating as pupae. This cocoon is rather inconspicuous, being about one-half inch in length and is usually tucked away into some crevice or under a piece of loose bark. In orchards with smooth barked trees the cocoons are often found on nearby fences and in cracks in the ground near the trees.

With the coming of warm weather in the spring the larvae change to pupae and emerge about the middle of May, earlier or later depending on the weather conditions.

The moths have a wing spread of one-half to three-fourths of an inch. The fore wings are striped transversely with alternate bluish gray and brown. The hind wings are grayish brown and the body is the same color as the hind wings. The moths are nocturnal in habit and very active. The eggs are laid three to five days after emergence if the weather is warm, each moth laying 50 to 100 eggs. The eggs are laid singly and are of a milky white color about one twenty-fifth of an inch in diameter. The moth usually deposits her eggs on the upper surface, although a few may be deposited on the fruit or the branches.

The incubation period is determined by the temperature. It requires an accumulative temperature of 160 degrees above a daily average of 50 degrees for the eggs to hatch. When the temperature falls below 50 degrees the development of the embryo larva within the egg remains at a standstill. The young larvae are about one-sixteenth of an inch long with a black head. Those hatching from eggs laid on the foliage usually eat slightly of the foliage before entering the fruit. In nearly all cases the larvae of the first brood enter the fruit at the calyx end and inhabit the fruit for thirty days before becoming full grown. During this time they tunnel and burrow all through the interior of the apple. Having attained full larval development they leave the fruit at any convenient place and go down the tree trunk until they find a suitable concealed place to spin their cocoons. After making their cocoons and pupating therein they remain in this inactive condition from ten days to three weeks. The second brood of the moths emerge, lay the eggs, and the larvae hatch and enter the fruit. These larvae remain about twenty-eight days in the apple. Upon becoming full grown they make their way out of the fruit and again spin their cocoons, this time for the winter. In Indiana there are two complete generations of codling moth each year, but since they overlap larvae may be found in different stages throughout the season.

The control of the codling moth is rather simple where there is but one generation a year, but where there are two generations, as in our state, the insect can be controlled only by thorough and continuous

(Continued on page 172)

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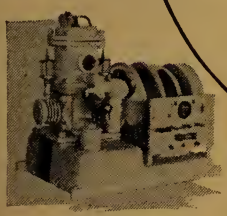

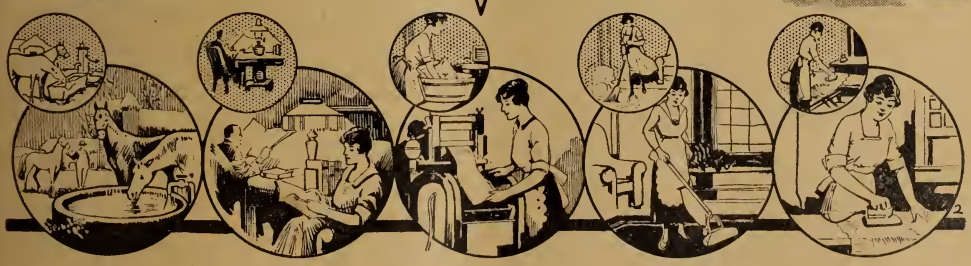

Visual Instruction in Vocational Agriculture

By F. K. Schmidt, '21.

THE present time might very fittingly be called the "visual age." Never before in the history of this country has so much attention been paid to illustrative work. Millions of dollars are invested in moving picture theatres in the United States, there now being more than twenty-five thousand theatres operated successfully.

These facts can be driven home by the wide-awake agricultural instructors who select proper illustrative material to present their ideas to the students. It is a fundamental rule of pedagogy to go from the concrete to the abstract, from the more familiar to the less familiar; thus the need of combining illustrative material from the farm, which are known to most pupils, with materials from less familiar sources. Pupils are interested in things about them and drudgery can be done away with by connecting the instruction with these interests. It is well to remember the pupils' interests in tangible things and in processes involving action.

Psychology tells us that we learn through our eyes, ears and feeling. Some people learn more by hearing things spoken, while others learn more by seeing things. Young students learn largely through what they see, some to such an extent that they are spoken of as eye-minded. Intelligent visualization undoubtedly helps to arouse interest and aids in remembering the material covered. Usually pupils hear too much and see too little.

The most valuable material to use for this purpose is that found in the community around the school. Field trips can be taken and specimens brought home for closer examination and laboratory work. Each pupil should be given a definite thing to do on the trip and proper arrangements made for conveying the material to the school. In this manner collections of plants, weeds and weed seeds, crop and garden pests, soils, feeds and other materials suitable for class work can be obtained. This is one form of visual instruction.

Charts can often be used to a good advantage to reinforce the lecture or recitations. They should be simple and interesting, thus centering the attention, leaving a lasting impression and presenting the subject logically. Sketches, outlines, figures and temporary pictures on the blackboard are helpful, but permanent charts are better for this purpose.

When it is impossible to obtain actual specimens of crops, fruits, weeds and animals, photographs make a good substitute. These pictures can be made yourself at a small expense, or if this is not possible they can be cut from farm papers and catalogues. They should be as representative of the community as possible. They can be placed on the walls or passed around in the class room. Some charts and pictures should be on the walls all the time, others only at certain periods.

Most schools now have electric lanterns and it is possible to obtain lantern slides on almost all agricultural subjects. Most slides can be obtained by paying the express charges on them. These are loaned and must be returned within a stated period. Moving pictures are used to some extent, but the lantern slides are excellent in presenting illustrations.

Since agriculture has been given a permanent place in schools of today it must be made practical. With this end in view more emphasis is being placed upon laboratory exercises, practicums and home projects, and more attention is being directed toward interesting the pupils by connecting the work of the class room with their daily experiences and home life. Visual instruction through the use of illustrative material will do much to create and foster interest and make the teaching of agriculture more effective.

PURDUE DAIRY CLUB EATS FRENCH ICE CREAM WITH LAFAYETTE ICE CREAM COMPANY.

At 7 o'clock Wednesday night, December 1, 1920, about forty members of the Purdue Dairy Club found themselves comfortably seated in the plant of the Lafayette Ice Cream Company. Mr. A. P. Holly, the owner, made us all feel much at home with his hearty welcome and cordial greeting. There among ice cream tubs and freezers, in the

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midst of all kinds of ice cream making machinery, the president called the meeting to order. J. L. Wann congratulated the Dairy Club upon having such a friend as our genial host and extended to him and his men the most sincere thanks. The place was ideal for such a gathering. When the first speaker, Mr. Holly, felt the need for concrete illustrations while enlarging upon the subject, "The Scope of Ice Cream Manufacturing," all he needed to do was to point to the latest invention of the gas machine, to the viscolizer, the ripening vat overhead, or to any other of the machines used in this work, and the point he made was firmly fixed in our minds. He opened the doors to us, so to speak, of the vast fields into which we may go. There is salesmanhsip, advertising, inventions, and the actual field of manufacturing. All these and many more offer work for the enthusiastic man.

Dr. Estey of the Economics Department was next speaker. He used for his subject "The Possibilities of Forming a Corporation When One Has No Capital." Considering that it was the end of a month and Christmas near at hand, the time when all students are "broke," this subject was immensely interesting. He took a very optimistic view of the question, and explained how a man without capital can form a stock company, also how a number of stockholders may form a corporation, and warned us against the common fault of over-confidence when success begins to come our way.

Mr. Holly proved his product by making French ice cream for the club and teaching them the process. While the cream was freezing his men very kindly served hot chocolate and cakes. It is needless to undertake to express the splendid taste of that frozen product, but as one member said, it seemed such a shame to see all the cream remaining in the tub with no one to eat it.

After explaining his own plant Mr. Holly took the Club on a tour of the factory where they followed the path of the milk from the time it enters the plant until it emerges as "That Good Ice Cream."

Purdue was recently honored by an inspection trip from the governor and legislature of Arkansas. They spent two days looking over the University and its laboratories.

"He's the Best Farm Hand We Ever Had"

Haven't you often heard your father say that about one farm hand—the "old reliable" who is always on the job, doing more and better work than any of the others?

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THE HOME ECONOMICS SOCIETY

By Amy I. Bloye,
Home Economics Department.

The Home Economics Society of Purdue University was organized in the fall of 1919. The object was to promote a better understanding of the scope of home economics and to bring about a feeling of fellowship among the girls in the department. The officers are elected from the Freshman and Sophomore classes, this relieving the upperclassmen of extra duties. This plan also gives opportunities of training in leadership to the under classmen.

The society meets the first and third Wednesdays of each month at 7:30 o'clock. At these meetings talks are given on topics of interest to home economics people. One or two meetings each semester are purely social in character.

A membership campaign was recently conducted during which was found that one-half of the members styling themselves, "The Needles," were sharp enough to gain more members than their duller opponents, "The Pins." As a result the "Pins" are now planning a party for the "Needles." A substantial increase in membership was the result of this drive.

A White Leghorn hen, Alderwood Babe Ruth, has made a new world's record by laying 326 eggs in one year.

DAIRY STAFF LAUNCHES PLAN.

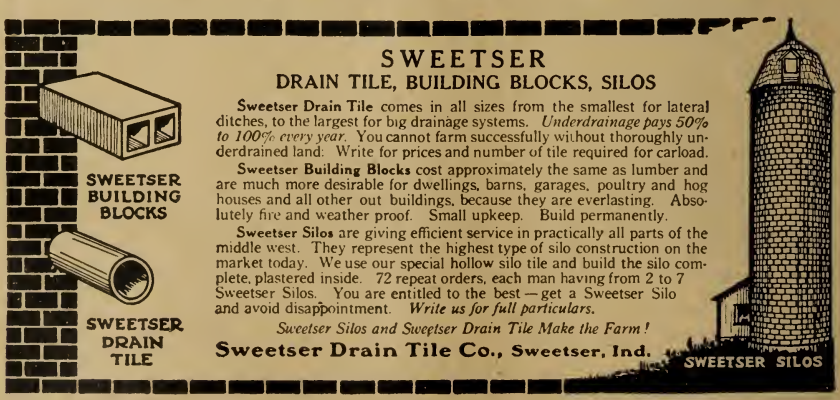
C. R. George and R. D. Canon of the Purdue University Extension Staff are launching a "Pure Bred Sire Campaign" in the twelve counties in the southeastern part of the state. "Use nothing but a pure bred sire" is the slogan.

THE CODLING MOTH, OR APPLE WORM

(Continued from page 166)

sprayings. In the control of this pest advantage is taken of the knowledge that the first brood larvae enter the apple at the calyx end. For about two weeks after the petals fall the apple is in an upright position with the calyx lobes expanded. A spray composed of one and one-half pounds of powdered arsenate of lead, twice as much of paste, to fifty gallons of water is put on four or five days after the petals fall. This is applied under pressure of about 125 pounds. The spraying is usually done from a tower mounted on a wagon because the apples are in an upright position and the spray must be directed downward to fill the calyx cup. Too much stress can not be placed on thorough spraying. The object of this spray is to enclose the poison within the cavity at the blossom end before the calyx lobes close, so that when the larvae burrow their way into the apple they will be poisoned before any injury is done.

The next spray depends upon the time of emergence of the moth and the weather conditions during incubation. To determine the correct time of the second spray some of the cocoons should be collected in the fall and kept in a cage under natural conditions during the winter. The cages should be watched in the spring for emergence of the moths and the time they lay their first eggs. After the first eggs have been laid the temperature should be recorded each day until the daily average above 50 degrees has reached a total of about 140 to 145 degrees, when the second spray of the same material as the first should be applied. The object of recording the temperature after the eggs have been laid is to determine the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time first eggs will hatch and to have the spray fresh on the trees for the larvae that feed on the foliage before entering the fruit.

Since there is no distinct dividing line between the first and second broods the trees must be thoroughly sprayed at more or less regular intervals the entire season. These sprays may be combined with lime sulfur, to control the numerous diseases that attack the apple, and with nicotine sulfate when plant lice are present.

Many orchardists practice banding the trees with burlap, tar paper, or corrugated paper to entice the larvae to spin their cocoons beneath them and these are later destroyed. In properly sprayed orchards the bands will not pay for the trouble and time involved.

There are many natural enemies of the apple worm, mostly tiny wasp parasites. In addition to these there are some twelve to sixteen species of birds that feed on the larvae. The downy woodpecker, nuthatch, and chickadee are the most common ones. It is the great work of these birds that makes it quite often hard to find a larva in its cocoon in March or April.

It should be remembered that the codling moth is a very destructive insect, but that most of the damage done can be prevented and the wormy apple practically eliminated if intelligent, thorough, and consistant spraying as outlined above is practiced annually.

Good horses never go begging, though the market may be dull for scrubs.

PARALYSIS AMONG EWES.

"Exercise? We hear a great deal about the value of daily exercise for breeding ewes in winter," said a young sheepman in a meeting in Montgomery county, Indiana, recently. "For my part I don't see any reason to go crazy about it."

As he finished, a veteran jumped to his feet and asked "How many here have had ewes die of paralysis?" Three-fourths of the group held up their hands.

"Well," said the old shepherd, "exercise your ewes daily and paralysis in your breeding flock will largely be eliminated. I used to have a great deal of trouble, but in recent years it has practically been eliminated in my flock. We follow the practice of scattering dry roughage out on our fields, to be put in corn the next season and this takes the ewes a considerable distance from the sheep shed every day. It always does the ewes the most good to exercise on their own initiative and heavy, clumsy ewes won't exercise unless some inducement is offered."

Daily exercise is good for pregnant ewes because it stimulates the circulation of blood and assists in keeping the digestive tract open, says Claude Harper, sheep specialist on the extension staff of Purdue University. When the digestive tract fails to function properly a toxic condition is set up in the body. This may react in the form of paralysis in the breeding ewes. Scatter your clover hay and corn stover on the fields induce the ewes to exercise and most of them will keep in good physical condition.

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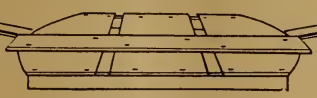

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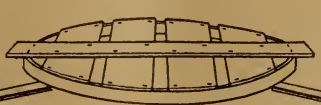

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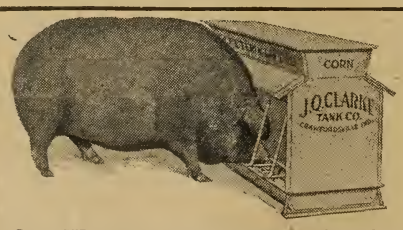

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PRESERVATION OF MEAT.

(Continued from page 157)

Canning Meat.

The canning of meat has not been so extensively practiced as the canning of fruits and vegetables, and many housekeepers know little about the methods employed in the process. Meats may be canned at home and kept in excellent condition, and where there is a surplus to be cared for, canning may be the best method to employ. There are several points that should be observed in canning meat:

1. Meat to be canned must be in absolutely perfect condition. Cooking tainted meat may destroy the bacteria present but will not destroy poisons already formed by them.

2. Meat may be successfully canned by the cold pack process. The wash boiler with a false bottom made of wood forms a good outfit. The water must always be one inch over the tops of the cans during the processing.

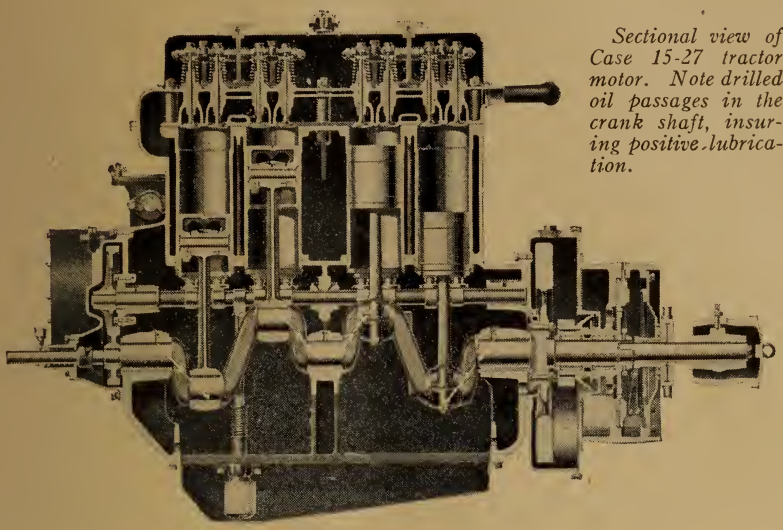
3. Glass cans may be used. The cans should be tested by filling half full with water, placing the rubber, putting on the lid and sealing tightly. Turn the can upside down, and after allowing it to stand a few minutes, examine for leakage. Tin cans when used should be new and of good tin with no rusted places on the surface.

4. When canning meat by the cold pack process, be sure that the rubbers used are of good quality. Test the rubber by making a fold in the rubber and pinching it to see whether it will crack, or by stretching it to see if it will break. In either case the rubbers are of poor quality. Never use an old rubber or one that has been used before.

5. Be sure the cans are tightly sealed after the processing. The secret of successful canning lies in having the meat absolutely sterile when the can is sealed and in order to keep it so the seal must be absolutely perfect.

Beef.

Method 1. Cut beef into pieces of desired size, removing all gristle, surplus fat and bone. Bone may be left if desired, the belief being that it adds flavor to the canned product. Pack in sterilized jars, add 1 teaspoon salt to each quart, fill can with hot water. Partially seal and process in water bath for three hours. Finish seal immediately upon removing from water bath.



Sectional view of Case 15-27 tractor motor. Note drilled oil passages in the crank shaft, insuring positive lubrication.

The First Consideration

The engine of course, is the heart of a tractor. Upon it depends, largely, the functioning of the entire tractor. The engine, therefore, should be the first consideration in judging a tractor.

Case Kerosene Tractors are equipped with Case-built, four-cylinder, valve-in-head, vertical engines mounted crosswise on the main frame. Practical experiments and field experience have proved that this type of motor is by far the most advantageous for heavy-duty field work, both from the standpoint of power and economy. Being mounted crosswise on the frame permits the use of simplified all-spur-gear transmission—a straight line drive that delivers the highest percentage of motor power to the drawbar. Removable cylinder barrels add years to the life of the motor—in fact, make possible renewal of cylinders, after long usage, at small cost.

Every detail of engine design and construction in Case Kerosene Tractors has been planned and executed on this same basis of economy, power and long life.

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KEROSENE TRACTORS

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Method 2. Cut beef into pieces of desired size. Brown in hot fat in frying pan. Pack in hot sterilized jars, add 1 teaspoon salt to each quart, fill jar with hot water. Partially seal and process in water bath for three hours. Finish seal immediately upon removing from water bath.

Method 3. Cut beef into pieces of desired size. Place in boiling water and simmer thirty minutes. Remove from water and pack meat in hot sterilized jars, add 1 teaspoon salt to each quart, fill can with hot meat broth. Partially seal and process in water bath for three hours. Finish seal immediately upon removing from water bath.

Pork.

Roast Pork—Roast as for table, fill jars with large pieces, and fill about one-half full of roast liquor, partially seal jar and cook 2½ hours in hot water bath.

Sausage—Shape sausage into cakes. Saute or bake until cakes are well browned. Pack carefully and tightly into jars. Add small amount of water to fat, and pour this over the sausage, putting into each can only liquid enough to come one inch from bottom of can. Partially seal, process in hot water bath 3 hours.

Tenderloin—Cut into pieces of desired size, saute in hot fat in frying pan until browned and partially cooked. Pack in hot sterilized jars. Add small amount of water to fat and pour over the tenderloin, adding only enough to come one inch from bottom of can. Partially seal, process in hot water bath 3 hours.

Additional recipes may be obtained from the following bulletins:

Farmers' Bulletin No. 183, "Curing and Keeping Meats on Farm."

Farmers' Bulletin No. 913, "Butchering Hogs and Curing Pork," obtained from Division of Publications, Dept. of Agriculture, Washington, D. C.

Leaflet No. 104, "Canning Meat," obtained from Dept. of Agricultural Extension, Purdue University, LaFayette, Ind.

So many of us are so busy endeavoring to make a living and to save up something to satisfy modern wants and needs that we are in danger of forgetting our responsibilities in the community in which we live.

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Why Milk By Hand?

ARE you milking by the old hand method? If you are we want you to visit a Perfection owner and see his Perfection milk. Better than that, try one on your own farm. After seeing the Perfection in action you'll give up hand milking.

Notice the remarkable saving in time and work. One man and a Perfection replaces three hand milkers. This means enough savin wages of hired help to pay for a Perfection in less than a year.

Watch how your cows take to the action of the Perfection teat cup. Put your finger in the teat cup and feel that gentle suction followed by a downward squeeze and then a period of rest. That action explains why thousands of dairy farmers have given up hand milking for the Perfection. It's a perfect copy of the calf's milking.

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PERFECTION MILKER

REGARDING BLACK RULER

(Continued from page 140)

cover throughout and a sweetness of type and touch that make him one of the strongest champions which the International has ever brought forth."—Breeders' Gazette.

"Black Ruler, however, was clearly the winner. Jack Douglas, his feeder, and Prof. J. H. Skinner, under whose direction the animal husbandry department of Purdue University has fitted and shown four grand champion steers at the International, were palpably confident that this masterpiece of the feeder's art was headed toward the supreme honor. Black Ruler was trained and prepared and confidently sent into the showyard for the avowed purpose of meeting the Shorthorn steer Cloverleaf Jack."—Breeders' Gazette.

"A more perfect animal than the Aberdeen-Angus, Black Ruler, for quality, style and smoothness of flesh, with an exceptional outline, is hard to find, and Purdue University is to be congratulated on breeding and fitting him."—Walter Biggar, the Scotch judge, in the Breeders' Gazette.

WHY THE PANIC HOLDS OFF.

People have been on the lookout for a panic for a year or more. That's the reason we are not going to have a panic. Panics, like Indians, rely upon the element of surprise for success. Everybody knows that during a panic is a good time to buy. More money is available now for taking advantage of panic prices than the world ever saw before. No wise panic would ever emerge from ambush knowing that so much ammunition has been laid up to swat it with. The panic of 1907 slipped upon us. None of its relatives can do that now.—The Agricultural Review.

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Some of our readers complain that they have not been receiving their paper regularly. In all such cases notify us at once and the matter will be promptly investigated. The Agriculturist stands ready to make good all losses of this kind. Address such correspondence to the Circulation Manager of the Purdue Agriculturist, West Lafayette, Ind.

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KINGAN & CO. LTD.

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CLETRAC carries power farming to the four corners of the earth. Its ground-gripping tracks, its heavy-duty motor and its sturdy, stand-the-gaff construction are helping to modernize the farming customs of sixty-five countries.

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The vastly increased milk yield of the pure bred dairy herd has vindicated the years of scientific study of Dairy problems and has also established the principle that quality is always economy.

The distinctive and wholesome sanitary cleanliness which the use of

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is providing to the Dairy Industry is likewise the result of years of scientific study and careful selection.

So consistent in protecting the delicate qualities of milk food is the use of Wyandotte Sanitary Cleaner and Cleanser proving that the results of increased milk production has been conserved to the Dairy Industry.

An order on your supply house will convince you that with cleaners too, quality is economy.

Indian in circle in every package

THE J. B. FORD CO.,
Sole Mnfrs., Wyandotte, Mich.

POULTRY JUDGING TEAM.

(Continued from page 150)

more judging work might be done. At Fort Wayne they met with a cordial welcome from Mr. Holterman, a Barred Plymouth Rock breeder; Mr. McDonald, a Wyandotte breeder, and Mr. Beatty, a Rhode Island Red breeder. At each place four classes of birds were judged.

The team arrived in Chicago Thursday morning, and between then and Saturday found much of interest in the poultry exchanges, markets, packing and refrigerating houses, and many other poultry plants.

Saturday morning at 8 o'clock the contest began, continuing all morning. In that time each team of three men judged one section of birds according to the fanciers' standard, and one section from the standpoint of utility. In each section there were four classes, of four birds each. In the fancy section there were classes of Barred Plymouth Rock pullets, Rhode Island Red cockerels, White Wyandotte hens, and White Leghorn cocks, while classes of White Leghorn, Barred Plymouth Rock, Rhode Island Red, and White Wyandotte hens made up the utility section.

Saturday afternoon it was announced at the Coliseum that Purdue's team had won second place, Missouri's team receiving the honor of first place and Iowa's third.

This is the first attempt at a contest of its kind in the central west, but, as Coach Schwartz and the coaches from the other universities say, as a field of intercollegiate competition it has come to stay.

L. E. Husted '20, of Woodburn, and Miss Greta Sewell, of Otterbein, were married at the home of the bride's parents, Sunday December 19. Immediately following the wedding ceremony they left for Ames, Iowa, where Mr. Husted will take up extension work. While in School Mr. Husted served two years as business manager of the Agriculturist.

Grasshoppers winter in the egg stage within two inches of the surface of the ground and the young are easily prevented from issuing the following spring by plowing to a depth of six inches during fall, winter or early spring. The eggs hatch early in May.

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LAFAYETTE, INDIANA.

BOYS' POTATO CLUB WOORK.

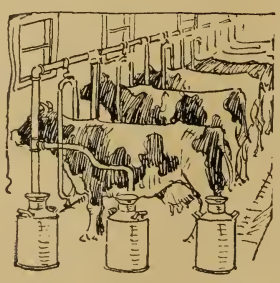
(Continued from page 164)

personal help to the vocational teachers taking up the work. Meetings were held with the boys interested in growing the crop, and illustrated talks were given on all the main points.

To stimulate greater effort a Statewide Potato Show was arranged at which club winners and boy potato growers will be given a chance to compete with each other in winning some of the six hundred dollars offered in prizes. The show will be held January 10 to 14, 1921, during Farmers' Short Course at Purdue. Other classes open to boys and girls not doing regular potato club work will give every one a chance to show what they have done along this line.

From present indications it looks like this show will be the first real exhibition of "Hoosier Spuds." If it is as successful as the club work has been, it will go a long way in helping stimulate the growing of better potatoes in the future.

Have you named your farm? It is an excellent advertisement.



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International Special Dairy Feed

At the New Rock-bottom Price

We have slashed the prices on International Feeds both ways from the middle. Of course we are taking a loss, but we are ready to do this to play the game with the thousands of feeders who have so wholeheartedly approved International Feeds for years.

Don't take the price drop in your dairy products too seriously. The cut we have made in price on International Special Dairy will allow you to feed it at the same old good margin of profit. Same feed, same quality, at a smashing drop in price.

International Special Dairy Feed Is Guaranteed

to produce more milk than any other feed of similar analysis. You should get two more quarts of milk per day from each cow.

Remember that this feed is priced down to produce milk at a profit on the prices you secure. Write us direct for full information if you have no International dealer near you.

LIVE AGENTS WANTED—A live agent can quickly sell several cars of feed in each vicinity at this new, low price. Write for details.

INTERNATIONAL SUGAR FEED CO.

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Skilful Feeding

is the secret of maximum milk yield

Feeding cows a generous balanced ration of palatable feed containing the right proportions of protein, carbohydrates and fat will insure a full yield of rich milk. The difference between profit and loss in dairying is mainly a matter of **feed.**

ACME Dairy Feed

is a balanced ration. The experience of many years goes into its making. Every ounce of it is pure and wholesome. It contains no cheap fillers and no waste.

Acme Dairy Feed produces results. It is palatable—the cows like it—and it contains the exact proportions of health-giving milk producing elements necessary to secure a maximum yield of milk.

Acme Dairy Feed is used by thousands of the leading dairymen of the country and has stood the test of many years.

Ask your dealer for ACME Feeds

Make every cow a 100% producer by using the palatable balanced ration—Acme Dairy Feed.

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Entering into 1921, this Company has affected arrangements which include provision for time payment and price reduction guarantees in the sale of its tractors. Prospective Titan owners will be glad to have the assurance of this benefit and safeguard during the present period of uncertainty. Details may be had by application to any International dealer or by letter from the address below.

Farmers who believe in the money value of high standards in agriculture, as this Company believes in manufacturing standards based on quality, will be helping to build higher the achievement of Titan in 1921.

INTERNATIONAL HARVESTER COMPANY
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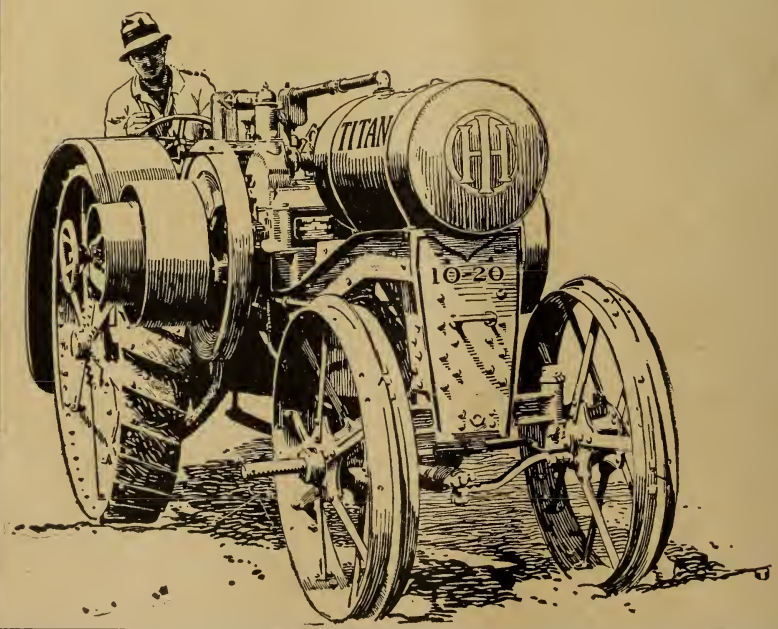

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FEBRUARY, 1921

Vol. 15 No. 5

Feed the Whole Chick

They can Build Only as You Furnish the Material

No wonder so many grain fed chicks are so scrawny, badly feathered, light boned and sickly. They don't get enough of the necessary materials to build their bodies.

As the chart above shows, grain feeds furnish too much food for energy and heat, and less than half enough for blood, bones, nerves, vital organs, muscles and feathers. How could chicks build strong bodies when they are so short of materials needed for almost every part of the body?

Purina Poultry Chows

Purina Baby Chick Chow and Purina Chicken Chowder fed in proper proportions supply ALL the growing elements needed for thrifty growth. Special attention has been given to the vitamine and protein content. Amino acids necessary for growth which are lacking in grains are supplied in Purina Chows fed the Purina Way. You can readily see then why Purina Chows can be sold on the money-back guarantee, that Purina-fed chicks will develop twice as fast during the first six weeks, as chicks fed a grain feed. Put Purina Chows to the test.

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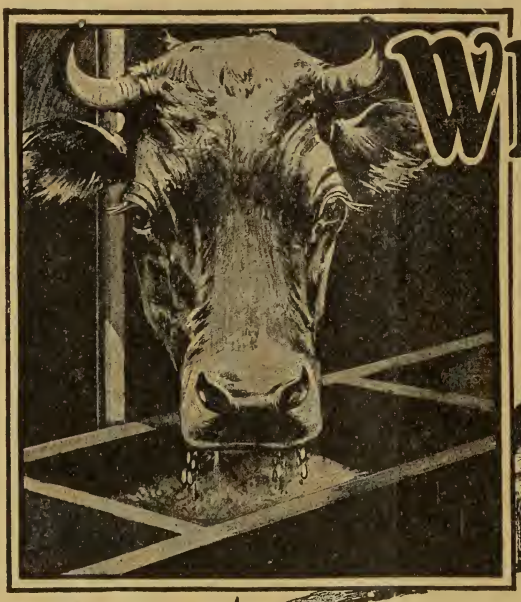

What Does Your Feed Cost Per COW ?

What does it cost you to feed your cows? It depends entirely on **how** and **what** you feed them. The only way you can figure feed costs is to deduct the cost of feed from the value of milk production.

If you feed your cows sparingly and try to economize on feed, your feed costs will be high because the first use made of the feed your cows consume goes to provide bodily maintenance and leaves little for milk production.

But if you feed the **right kind** of feed liberally—give your cows sufficient to provide them with both bodily maintenance and milk producing nutrients, your feed cost will be low. That's why

SCHUMACHER FEED AND BIG "Q" DAIRY RATION

fed according to the Schumacher Feeding Plan have become so universally popular with dairymen and farmers everywhere.

Schumacher Feed, the world's greatest carbohydrate feed is composed of the **right** kind and variety of grains to supply bodily maintenance—to keep cows in tip top shape physically—provide them with energy—stamina, etc. while Big "Q" Dairy Ration, the renowned high quality protein ration, supplies the needed food nutrients to be converted into milk.

This combination fed liberally **reduces feeding costs** because it **increases health condition and milk** production. You can prove it to your own satisfaction and profit by making a test with any cow. The results will be gratifying and make you a strong advocate of the Schumacher Feeding Plan—the plan that costs less because it produces more. Ask your feed dealer

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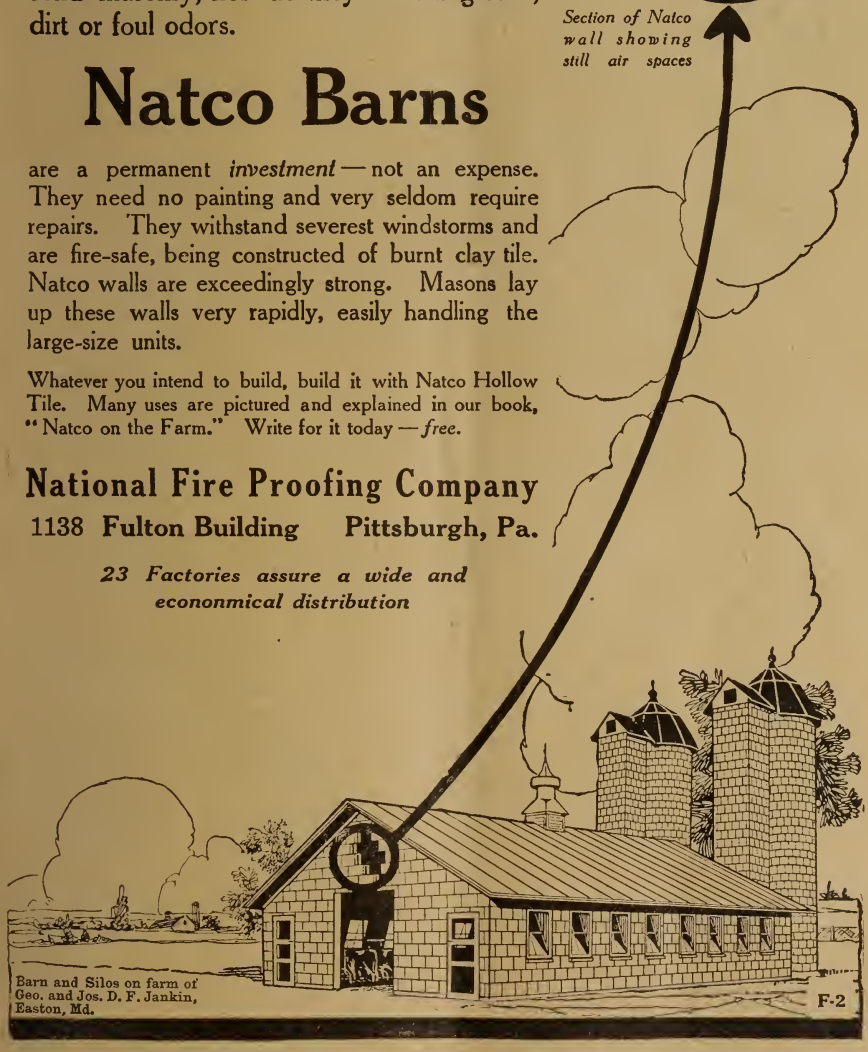

Barn and Silos on farm of Geo. and Jos. D. F. Jankin, Easton, Md.

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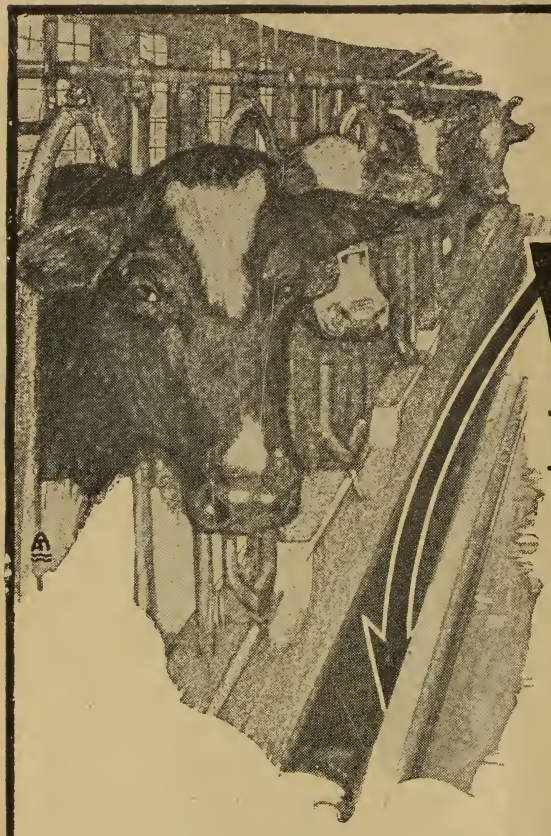

WHAT
Do *you* put in *there?*

FEED, yes. But—
WHAT KIND is it?

At the fairs and dairy shows, many of the most successful dairymen tell us they get more dollars' worth of milk out of a dollar's worth of BUFFALO CORN GLUTEN FEED, fed mixed with wheat bran or millfeed, oats, etc., than any feed they know of.

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See that there is plenty of BUFFALO CORN GLUTEN FEED mixture in the feed trough in front of your cows—and you will understand *why* BUFFALO CORN GLUTEN FEED is so well thought of on thousands of real dairy farms.

FEED UP! Your dealer should have BUFFALO CORN GLUTEN FEED. If he does not, write us for literature and sample, giving us his name and address.

Corn Products Refining Co.

New York — MANUFACTURERS OF BUFFALO CORN GLUTEN FEED — Chicago

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Entered as second class mail matter December 4, 1906, at the Post Office, LaFayette, Ind., under the Act of Congress of March 3, 1879.

Subscription Price One Dollar Per Year. **Advertising rates sent on application.**

J. H. Skinner, Dean of the School of Agriculture.

The Purdue Agriculturist

VOLUME XIV FEBRUARY, 1921 NUMBER 5

The National Farm Bureau

By Dean J. H. Skinner.

This is the first of a series of three articles to be contributed by Dean Skinner. In next month's issue he will discuss the state organization, and the following month the county organization of the Farm Bureau.—Editor.

A REAL, for sure Farmers' Organization of national scope and character, with ample funds to do things and a million and a quarter members in thirty-two states having state organizations, successfully launched within fifteen months from the time of the first meeting for preliminary organization, is a wonderful record of achievement.

This record was doubtless made possible because of a real need which developed during the war and further emphasized by the unusual economic conditions resulting from the war.

The American Farm Bureau was organized after a two day meeting of state representatives of widely differing views, held in November 19, 1919, in Chicago.

Its outstanding accomplishment as the president, J. R. Howard, of Iowa, has said—is undoubtedly "the gaining of the confidence and high esteem of the public generally and many of the biggest men in agriculture, industry, and state and national government." In other words, it has been able to truly represent American farmers. Also it has done much, in fact, all that could be done on freight rates, transportation and marketing problems.

The selection of men of high purpose and sound judgment for officers is in a large measure responsible for the remarkable success of the organization. Their determination to study the needs of the industry and those engaged in it and their efforts to obtain counsel and suggestions for broad-minded men of experience and knowledge of agriculture and big business generally have enabled this organization to wisely shape its policies.

"We must sift out sound, economical principles before we get behind a plan of action," said Mr. Howard at the second annual meeting. This is a splendid gospel in these days of unrest and wild agitation for price fixing, cooperative buying and selling and class legislation. Much more of real worth and permanency is likely to be accomplished for agriculture by proper official representation in councils of business and government than by arraying one class against another or by class legislation, however important this may be.

There are great problems confronting American farmers, such as proper credits, better transportation facilities, marketing and legislation. These are intimately linked up with the industries, commerce and business of a great nation and the world at large. They can only be solved by the united efforts of men of broad vision not only in agriculture but every walk of life. It is therefore important that the farmers' representatives in these councils have the confidence and backing of the organization to the last man in the local community. These men must be able to represent and speak for agriculture and farmers with authority and one voice. One of the chief difficulties in arriving at national and state agricultural policies in the past has been the lack of authoritative representation and concerted

The American Farm Bureau is fundamentally sound. It is exerting a powerful influence and deserves and should have the hearty, generous financial support and co-operation of every thinking farmer in America.—DEAN SKINNER.

NEXT MONTH—Claude Harper, Sheep Extension Man of the Experiment Station, and nationally recognized as a sheep judge, contributes our feature article. Watch for it.

action and the voicing of many different opinions many of which were not based on sound principles. Many excellent farmers are thoroughly familiar with local conditions and needs who know little of the relationship between agriculture and other lines of business and less of state, national and world conditions. The American Farm Bureau and various state and county organizations have already found many leaders of the right type who have the vision and ability to represent and speak for them. Nevertheless, one of the great problems as well as responsibilities is the discovery and development of a sufficient number of big, broad-minded men of sound judgment and unselfish purpose for township, county, state, national and international agricultural leadership.

Many members of the local organizations have had little opportunity in organized work of state and national character. They do not realize the relationships and conditions that must be considered in solving the big problems. In many instances they sincerely believe that the American Farm Bureau with more than a million members can and should solve their many vexing local problems, and that when it has done this there will be nothing further necessary. They imagine that they are the victims of big business and politicians. They do not realize the size of such great problems as financing the farmer and marketing his products. They are oftentimes upset and disturbed by loud-mouthed agitators who have axes to grind and little sound information to back their theories. It is therefore important that Farm Bureau members be made to see that the problems of the local organizations are different and the program of work must be different from that of state and national Farm Bureau, also that while they are different, the broader policies underlying the local organization and work must be in harmony with those of other local farm bureaus and of the state and American Farm Bureau.

To my mind there is much need for a strong educational program among the members of the local bureau. They should be made to fully realize the size and nature of the job ahead, that it will take much time, large sums of money and constant hard work to build a national organization with an ideal common to its members and the equipment, machinery and men to represent and authoritatively speak for Uncle Sam's biggest business; that it will require much travel and thorough investigation not alone in America but all over the world to secure the necessary viewpoint and information; that whatever may be done looking toward the solution of agricultural problems is likely to affect every other industry and business. The membership must learn to work and stand loyally together, and be schooled in Farm Economics. It must learn to study, investigate and solve local problems through organized effort in order that the members may understand and be prepared to assist in the intelligent solution of state and national problems. The local organization should busy itself with the local conditions, big community problems and the development of sound leadership while the national leaders are building a foundation upon which to construct a permanent organization for the future. It should not clamor for immediate results from the state and national organizations. Its educational work which we believe is as important as its economical program must be fostered by the national and state organizations which are absolutely dependent for power and influence on strong, well organized working county farm bureaus.

The American Farm Bureau has made a remarkably successful record but it will have to go through even more trying conditions than it has met during the past year. The very fact that it has large influence will make its road somewhat rough for a few years because selfish commercial interests, politicians and others will try by every conceivable means to use it to accomplish their ends. Its officers must be on guard and searching in their investigations and careful in their analysis, sound, conservative and constructive in their conclusions, to retain the confidence thus far established.

The American Farm Bureau is fundamentally sound. It is exerting a powerful influence and deserves and should have the hearty, generous, financial support and cooperation of every thinking farmer in America.

Showing Cows in Dixie

By R. R. McNagny,

Breeder of Killarney Farm Guernseys at Columbia City, Ind.

THERE is something stirring about the very name "Dixie"—a wholesome, appealing tingle that draws one. When you multiply the word by eight weeks, add dairy cows for subject matter and write in "business" as your object, you have a really potent combination. With all this in mind, and after a friend had begged, wheedled and cajoled me for two years to bring our show herd south, the writer came to a sudden conclusion. You know they say a Hoosier will try anything once. **South we would go.** And so, one hot, sticky, crowded afternoon in September last we loaded the Killarney Farms Guernseys at the state fair grounds in Indianapolis and began the long-urged invasion of Dixie.

Showing cattle is not what one might call an "unalloyed pleasure." In fact, as a friend once wrote me, "No really sane person would ever attempt to show cattle on the fair circuit." Theoretically, a breeder takes this means of reaching the public; (1) to encourage interest in his breed; (2) to lay his wares before that part of the public already interested in them, and thereby win glory and advertising with a view to future business; and (3) to make possible sales en route. The reasoning is perfectly sound, but as a matter of actual practice the beginner soon convinces himself that he is really merely making business for an unappreciative railroad whose golden rule is "The Public be damned," paying tribute to modern Captain Kidds who sail under a banner bearing the device "Grain and Feed," and furnishing amusement for a large part of the great unwashed which in the main knows but one question—"How much does 'e weigh, Cap?"

However, aside from all these real and theoretical phases of the business there remains that age-old romantic appeal of the road which in all history and time has led men to venture forth on more or less uncharted seas to "show things." The romance of heated contests in the arena, of midnight loading under a harvest moon in ghostly freight yards, of shrewd debates and argument with other show folk, railroad clerks, and fair managements, the daily prospects of sales, and the magic thrill of appearing as part of an exhibition, a curiosity to the ever-changing crowds, all combine to make a trip on the big circuit a thing likely to be repeated.

Our itinerary this summer covered the Kentucky State Fair at Louisville, the Tennessee State Fair at Nashville, the Tri-State Fair at Memphis, the Alabama State Fair at Birmingham, the Mississippi-Alabama Fair at Meridian, Mississippi, the Southeastern Fair at Atlanta, and the Georgia State Fair at Macon, Georgia.

From a dairy standpoint the Dixie States are both a good and a bad place to show. Good because, in all this broad country of ours, there is no territory so rapidly opening up to the dairy cow. For a dozen years the agricultural colleges and the farm press, supplemented by the periodical visits of Old Man Hard Times, have been preaching the errors of the one-crop system, until one sees in nearly every section of the South sporadic efforts toward a change. Diversified farming is an established thing in many localities, and the short winters, cheap feed, and simple housing recommends itself to dairying along with this above all else.

On this southern circuit we met at various points good show herds of Ayrshires, Holsteins and Jerseys, as well as other Guernseys in numbers, and while of course each breed likes to feel that it is making the big show of the fair, I think all of the dairy showmen felt pleased and repaid by the warm interest and questions from the crowds which flocked through the dairy barns everywhere.

These southern fairs differ materially from their larger and overgrown northern sisters. In the middle west the Indiana, Ohio and Illinois State Fairs are tremendous enterprises, the livestock features being among the largest, and running into three and four hundred carloads of exhibits. These figures rapidly decrease as one progresses south, Louisville being much smaller than Indiana, and Nashville smaller still. The cattle, sheep and hogs shrink steadily, until at Birmingham and Meridian this year

the livestock exhibit, aside from race-horses, had dwindled to fifteen carloads. This amount was of course augmented by many southern herds at the Southeastern Show at Atlanta, which is striving hard for a reputation as the big fair event of the South, and bids fair to take that place easily in the next few years.

It is interesting to note, however, that with the decrease in exhibits the importance of individual exhibitors increases in corresponding ratio. There is a much less complex official system, and southern fair officials seem more approachable. At our own state fair an exhibitor does well if he gets within gunshot of the fair secretary, who, by reason of the tremendous volume of everything, is an extremely busy man. At most of the Southern Fairs one comes to know the secretaries more intimately, in fact I think I talked with all of them on our circuit this summer without any particular trouble.

Yon know, the fair secretary is both the official business head and the official "goat;" and the exhibitor, without being official at all, is usually a "kicker." If the quarters assigned are crowded or inadequate, you see the secretary; if the water pressure is low or out of commission—see the secretary; if the feed man happens to be of a particularly piratical turn—see the secretary. HE is the man you are ultimately referred to anyway, and usually the quick way to get action is to hunt him up at once, make your complaint as emphatic as possible, and hint delicately that you have never been treated quite so badly as this, and you're not coming back. Usually this secretary is pretty much of a "regular fellow," and if your howl has any merit to it you get satisfaction—if it's only an unfulfilled promise to look into the matter.

All of these fairs are growing or outgrowing themselves rapidly. All of them are being run by men intensely proud of their own fairs as against neighboring ones. The South has until recently not been heavily interested in livestock. Barns, feed and housing conditions are not as complete as at northern fairs, and for both these reasons the northern and midwestern breeders have not in the past flocked south in large numbers. The boom is started, however. These fairs are eager for livestock exhibits now. breadth of Dixie.

They appreciate them, and buildings, conveniences and premiums—**as well as courtesy**—they are bending every effort to draw the show herds south.

I wish I could convey to every dairy cow breeder my impressions of the endless possibilities in a dairy way of all this Dixie territory. To me the South, or the part of it which we saw most, might be likened to the young countryman before the wild man's cage. He wants to know what makes it wild. Day after day this fall I stood and talked to eager men and women who had never seen a Guernsey; who commented audibly on what seemed to them her superiority over the only cow they knew—the native scrub; who wanted to know about her disposition, and her test, and her price. Many of these folk spent a day in our barns, and after leaving would wander back to fondly look 'em over once more. Many of them will buy, sooner or later, and they will probably buy from one of those fellows who showed down there this fall or next, if he has anything to sell. And they will buy his kind of a cow because they saw, and handled, and learned about her right down there at their home state show.

I tell you, fellows, field men may come and field men may go, county agents may prate, and the various breed associations may mail out tons of literature and it all will help. But the dairy cow will eventually go into this big southern territory, not so much because they **heard** about her down there, but because breeders have had the wisdom and foresight to take their herds right down there into those other Southern States as well as Missouri, and "SHOW 'EM."

In closing let me say that the Killarney Guernseys are not seeking the credit for this pioneer work. We merely helped, as did the other dairy herds on circuit this year. It was a purely business proposition, and as a business proposition it more than paid out, without considering any profit from future business arising out of our showing. But breed competition is keen Other men will go on the circuit. And you know a permanent business cannot be built on the strength of a single advertisement displayed once. And so a few more of us will have to go back next year, and more the next, until we have the gospel of the dairy cow spread through all the length and

The Farmer of South America

Some of the Finest and Some of the Poorest Land in World Found Here.

By Raymond Menefee, '23.

I HAD heard considerable about South America through Frank C. Beal, one of the assistant professors of Animal Husbandry of Purdue University. He had accompanied a shipment of purebred cattle to the Argentine Republic during the summer of 1919 and had returned with plenty of information of that country well in mind. He gave the account of the people, customs, commercial and agricultural conditions and the many opportunities open to Agricultural students in that country, especially to those interested in livestock production. With this news three of us students at Purdue, Theo. Sedgwick, Herschel Auxier and the writer, desired to see that country for ourselves. We arranged with Secretary W. A. Harding, of the Shorthorn Breeders' Association, to accompany a shipment of purebred cattle which was shipped April first, arriving in Uruguay a month later, after which we spent the time in studying the agricultural conditions of South America until our return in July.

Our new interest in South America goes further than business—it touches the American farmer. He is curious about that continent as a market for his dairy products, his fruit, and temperate zone foodstuffs. He is interested in it, too, as a competitor, for the prices of wheat and beef are governed by production in Argentina and Uruguay and tomorrow in Brazil. He is even interested as a settler. During a recent three months' circuit of South America the writer heard of a cattleman in Texas who thought it crowded for him and his boys, who were getting information about the great future cattle regions, where his boys might live again their father's range days.

The North American farmer hearing that South America is almost entirely agricultural, except for mining industries, wants to ask questions.

What sort of country is South America?

Would you advise an American farmer to emigrate there?

To what part would you go yourself?

What kind of a fellow is the South American farmer; how does he work; what does he raise; what are his politics; what does he think about; how does he live; what does he do for fun?

Tippecanoe Diamond, bred by Jack Van Natta, of Lafayette, and held by Mr. P. A. Reisag, of Montevideo, Uruguay.

The best way to begin answering these questions is to show what kinds of resources he has.

The chief point for the farmer is the kind of soil and climate that nature has provided by millions of years of slow work.

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Part-time and Evening Classes in Agriculture

By S. S. Cromer,

Professor of Agricultural Education.

PROVISIONS are made in both the State and Federal Vocational Acts for establishing three kinds of classes for the study of agriculture.

In the first place, **all day classes** may be established as a separate school or as a distinct department of the high school for pupils over fourteen years of age. Such pupils devote one-half of each day to academic subjects and the other half to approved class, laboratory, and field work in vocational subjects. They also apply their instruction to home farm conditions by carrying on home project work throughout the entire year.

In the second place, **part-time classes** may be established for persons over fourteen years of age who are giving a part of their working time every day, week or month to profitable employment on the farm and who are receiving, in the part-time class, instruction complementary to the practical work carried on in such employment.

In the third place, **evening classes** may be established for persons over sixteen years of age, provided they are fitted by experience, training and day employment to profit by the instruction offered. It is assumed that such persons are engaged in agricultural pursuits.

In the development of vocational agriculture in Indiana by far the greatest emphasis has been placed upon the **all day** class as a distinct department of the high school. This practice is justified by the desire of getting under way on a sound basis the so-called all day work of vocational agricultural instruction. The high school classes have furnished the first organized medium for attacking the vocational education problem. It is very evident, however, that the importance of part-time and evening class work should not be overlooked. In the majority of states where part-time education has been undertaken, it has been classified as "the short term course," as "the dull season course" or "the dull season winter short term." The term is usually ten weeks in length and starts after the Christmas holidays and continues until the boys are needed at home for spring work.

If the instructor in vocational agriculture expects to teach the course, then the schedule for the short course must be arranged to fit his regular daily schedule. In some cases it may be necessary to employ a special teacher for the short course work. Provision may be made for evening class work and discussion by those who find it impossible to attend the day class.

Mr. C. H. Lane, Assistant Director of Agriculture, Federal Board for Vocational Education, has made the following assumptions in stating the purpose of an agricultural part-time school or class, namely:

(a) That the persons who are to conduct work are employed in some agricultural pursuit which has in it a content which may be given to advantage in an organized school or class.

(b) That there are opportunities in the agricultural pursuit for promotion and advancement.

(c) That the persons employed in the agricultural pursuit are to be given opportunities for experience which will enable them to use to advantage knowledge and skill acquired in the school or class.

The controlling purpose of this class thus recruited must be to fit members for better employment or managerial practice in the given agricultural pursuit in which they are already employed.

If the local community providing agricultural part-time education is to meet real needs, it must carry the part-time education to the places where it can be given most advantageously to the persons who have entered upon the work of the farm. Since agricultural extension work, both evening and part-time, is to be supplemental to the daily employment, it is evident that it will be possible in many cases to give instruction on the farm. Through cooperation with the farmers it is possible, therefore, to secure adequate equipment for part-time work at a little or no expense to the community.

In setting up a part-time plan a study should be made to determine the most ad-

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vantageous places for the location of the school or class, whether in a school building or in a room hired for the purpose, or in an association hall, or elsewhere.

The equipment necessary for a part-time school or class depends entirely upon the group to receive instruction, the character of the course of study which has been determined upon, and the method of instruction adopted. Since the policies of the Federal Board recommend that the State Board shall require communities to state the aims of part-time schools or classes, it will be possible for the State Board to determine for the individual schools whether the equipment which is proposed is sufficient to carry out the declared aim.

Since instruction in vocational agriculture as in evening schools is supplemental to the day employment, it is evident that the course of study must be based upon an analysis of the agricultural pursuit and that the needs of the specific group to be instructed must be always in mind. It is, therefore, very evident that an analysis of the various occupations of the farmer must be made for given communities before any information of value to those in daily employment may be rendered.

In making up a course of study due regard should be given to the special requirements of the two general types of work, namely, directed or supervised practical work on the farm, which implies actual manipulation of farm machinery and materials, and related technical information inherent in the agricultural pursuit in which the pupil is engaged. Valuable service may be rendered by advisory committees in formulating courses.

The teachers in agricultural part-time work must be qualified to carry on two distinctive pieces of work: (1) That of farm work, and (2) that of giving technical and related instruction.

From the standpoint of farm practice the teacher should have as much experience in the practice of farming as should the teacher in an all-day agricultural school or an evening school. In general this should not be less than three years' successful experience in farming under commercial conditions. It is difficult to set up absolute standards as to vocational experience and the term three years is suggested here to safeguard against any tendency to employ as part-time or evening class teachers persons who do not qualify in the practices of the agricultural pursuit in which they are giving instruction.

When vocational education legislation was first contemplated, the emphasis was placed upon the vocational needs of those people who had dropped out of school and were engaged in the active agricultural pursuits. The upper age limits of such persons cannot be fixed. The lower age limit is fixed by the compulsory school laws. Consequently the ages of those students in attendance at part-time and evening classes may vary between 14 and 75 years. In one class of 38 pupils in Georgia the following information is of interest:

8 of the 38 pupils were under 20 years.
11 of them between 21 and 30 years.
8 of them between 31 and 40 years.
3 were 45 years.
5 between 50 and 60 years.
3 over 60 years of age.

It should not be forgotten that the State and Federal Governments have, through the enactment of vocational education laws, made it possible for communities to receive reimbursement for all approved kinds of vocational education.

In view of this fact our program for Vocational Agriculture is not completely operating until there is instituted in all agricultural communities not only distinct all day classes in the high school but also part-time and evening classes. The high school classes should be continuous from year to year, whereas the part-time and evening classes will be somewhat intermittent in their appearance in response to the nature of the demand.

VOCATIONAL TEACHERS
Enroll your students NOW in the Agriculturist's Essay Contest. Liberal Prizes. Write for information.

What Orchard Soil Management Studies in Indiana Have Shown

By F. P. Cullinan,

Associate in Pomology, Purdue Experiment Station.

TEN years ago the Horticultural Department of the Purdue University Agricultural Experiment Station began an extensive experiment in orchard soil management to study the effects of different systems of soil culture on the growth and production of apple trees. This experiment was carried on in a part of the 200 acre orchard of the Laurel Company at Laurel, Franklin County, Indiana.

Sod Plot. Note that the trees in this plot are smaller and less vigorous than those in the cultivated plot.

Comparisons were made on the effects of tillage with cover crops, mulch and sod on the growth and production of the trees. The trees had been one year set in the orchard at the time the experiment was begun. Briefly, the treatments which the various plots received are as follows: The trees in the tilled plots were given frequent cultivation beginning in the spring and continuing until the cover crop was sown about August 1st. The cover crop occupied the ground during the winter and was disced under the following spring. The mulch plots remained permanently in grass which was cut and permitted to fall back on the ground. A heavy application of straw was applied each year as a mulch collar around the trees. The amount of mulch applied was increased each year. The straight grass or sod plot received no outside material and the grass was cut and allowed to lie where it fell. The trees in this experiment are now in their 12th growing season and show remarkable differences in growth and production under the treatments which they have received.

Trees receiving clean tillage with cover crop during the ten years of the experiment have made about 38 per cent greater gains in growth than those which have been permanently in sod without any supplemental material. Trees which were in grass but which had received a heavy application of straw mulch made nearly as good growth as trees in cultivation.

From the standpoint of production, the differences between the plots are also very great and follow the same general relationship as tree growth. The trees began bearing fruit in 1915 but bore their first real crop last year. This year's crop was the

largest that had been borne to date. The cultivated trees have produced over seven times as much fruit as has been borne by the trees in sod. The trees receiving a heavy application of straw mulch did nearly as well as the trees in cultivation.

Now why are these results? What are the factors that have been responsible for this growth and production or why have cultivation and straw mulch given equally good results while grass alone is outstandingly so poor? Wherever the soil treatment has been such as to conserve moisture, at least sufficiently to satisfy the tree requirements, whether it be done by cultivating or adding some outside mulching material, the growth of the tree and production of fruit have been increased. Moisture in this orchard has been one of the limiting factors in tree growth. Plant food is also very essential to tree growth but without an avaliable moisture supply, growth and production will be seriously limited. This is especially true of young trees growing in a soil of low humus content which is not very retentive of soil moisture. It is axiomatic that cultivation is a practice which conserves moisture and liberates plant food. This is the condition which has prevailed on the cultivated plot. It is true that organic matter has also been added through the cover crop which has been turned under each year, as green manure. In the case of straw mulch where the production and growth of trees were nearly equal to those of the cultivated plot, the moisture has been conserved by the heavy application of straw over the surface of the ground. This decaying straw has undoubtedly furnished nitrates which are so necessary for tree growth. In the grass plot there is no such conservation of moisture. The grass is using up plant food and moisture and there is no way of conserving it. Not enough moisture and plant food are available to keep the trees growing vigorously, consequently they are low in growth and production.

The question which will naturally arise in the mind of the fruit grower is the relative economy of these different methods of soil management. The total production of fruit over the entire period shows that the cultivated plot has produced 87 barrels, the straw mulch plot 82 and the sod plot 12. The production of fruit in 1920 alone on the cultivated and straw mulched plots would cover the cost of production so far as the soil management is concerned, over the entire period and leaving a good net profit. During the last few years straw for mulching purposes has been very expensive but the results secured have paid for this expense.

Cultivated Plot. The trees in this plot have made about 38% greater gains in growth and have produced seven times as much fruit as has been borne by the trees in sod.

These experiments have answered certain questions of fundamental importance to the fruit growers of Indiana. There are in use what might be called two general systems of soil culture—clean tillage and grass. Obviously not all orchard land lends itself to both of these systems of soil management. On level land tillage or grass may be used, but on hilly land clean tillage is out of the question. The soil will wash down into the valleys and lowlands if there is no grass growing on the land to hold it there. There is a great deal of good orchard land in Indiana which cannot be tilled. Where the trees must be grown in grass, then some material should be used to mulch the ground around the trees. This mulching should be started as soon as the trees are planted and continued as the trees grow older. The mulch collar can be extended out each year as the tree itself begins to shade the ground. Any material that will decay and make a good covering of the ground will be satisfactory—straw, shredded fodder, marsh grass, etc. Another very satisfactory method of securing mulching material is to fertilize the entire tree area and stimulate the growth of the grass. This can then be cut and raked up around the trees.

It cannot be stated that one particular system of soil management is the best. The one which the fruit grower shall use will depend very largely upon his own local conditions. It should not be understood that grass in itself is always detrimental to tree growth. In fact, there are many successful orchardists growing trees and producing fruit in bottom lands in grass. In this case, however, moisture is not a limiting factor. Furthermore, there is a distinct difference between grasses which may be grown in the orchard. Land which will grow a luxuriant crop of alfalfa which is supplying nitrogen to the soil and at the same time providing a large amount of mulching material, is very different from thin soil supporting a weak growth of blue grass. Moisture cannot be added to the soil by fertilizing. It is more than a fertility question. The value of the fertilizer lies in its ability to stimulate the growth of the grass which in turn can be applied to the tree as a mulch.

One of the great drawbacks to the mulch system is the danger of field mice which are quite likely to come in under the mulch. These mice will girdle the trees during the winter time unless some precautions are taken to get rid of them. They not only girdle the trunk of the trees but may bore down to the roots and cause serious damage to those tree parts which cannot be protected. They should be poisoned systematically every year if they are to be kept from doing serious harm. Another method which has been used successfully to keep mice away from the roots and tree trunk is to dig a cavity around the tree and fill this with cinders.

Farmers' Short Course Big Success

THE Eighteenth Annual Farmers' Short Course held at Purdue during the week of January 10-14 was one of the best held in years. The total attendance running well above 1500 was very satisfactory, and the general satisfaction expressed by the visiting farmers was very gratifying.

Speakers and lecturers from other states and colleges were much in evidence and their messages were full of instruction and inspiration. Prof. Frank A. Waugh, from the Massachusetts Agricultural College, a landscape gardener of national note; Prof. F. E. Bear, an authority on soil fertility problems, from the Ohio State University; Roy C. Potts, of the Bureau of Markets, a dairy market expert; and Prof. P. G. Holden, formerly of the Iowa State College, now connected with the International Harvester Co., all leaders in their respective lines, delivered lectures of great interest and vital importance to the farmers of Indiana. Indiana has always been proud of the leaders within her own ranks, and several of these were on the program throughout the week. John G. Brown, President of the Indiana Federation of Farmers; C. L. Manwaring, a very successful commercial poultryman of Mentone; E. J. Barker, a prominent swine breeder of Thorntown; L. T. Foster, a sheepman of Crawfordsville; Mrs. Chas. W. Sewell, of Otterbein, prominent in extension and insti-

tution work; W. B. Krueck, formerly an animal husbandry instructor at Purdue, now operating a large Shorthorn farm in Steuben County, and W. H. Senour, of Brookville, a prominent dairy farmer; all Hoosiers and all boosters, were among those who spoke.

The State Corn Show, held in connection with the Short Course, surpassed all its former records and came forth with more than 350 entries of Hoosierdom's prime corn, a product which has for many years brought honor and fame to Indiana's farmers. Grand sweepstakes honors went to J. C. Isley, of Shelby county, on a ten-ear exhibit of Johnson County White, while V. L. Manuel, of Crawfordsville won sweepstakes in the single ear exhibits. G. J. Sauerman, of Crown Point, won sweepstakes on wheat; Wm. Tritch, of Corunna, won sweepstakes on oats, while Walter and Pressel, of Bluffton, won sweepstakes on soybeans, a new class in the show this year.

The Indiana Livestock Breeders' Association held its annual meeting Thursday. Topics relating to community breeding of hogs and sheep were discussed by R. C. Cain, a Miami county farmer, and L. F. Foster, of Montgomery county, and president of the Indiana Sheep Feeders' and Breeders' Association. The calf club as a community enterprise was presented by Lew Kerr and W. B. Krueck. Resolutions were adopted appealing to the legislature for more liberal support of Purdue and the Experiment Station, and recommending the establishment of an abattoir at Purdue for instructing students in cutting and curing meat. The breeders also urged that a new hog house be built and a larger hog farm be established for experimental work. E. J. Barker, of Thorntown, was re-elected president; E. M. Wilson, of Anderson, vice-president, and Prof. F. G. King, of Purdue, secretary-treasurer.

Two state breed associations, the Angus and Hereford, held meetings in connection with the Livestock Breeders' Association. The Shorthorn breeders postponed their meeting and will meet at Indianapolis in the near future. The Hereford clan selected R. C. Jenkins, of Orleans, for their president; Wesley Mickman, of Lafayette, vice-president, and F. G. King, of Purdue, secretary-treasurer. A. E. Stuart, of Lafayette; H. M. Mullendore, of Franklin, and W. P. Shrock, of Decatur, were named as new directors. The Doddie Adherents elected W. W. Wilson, of Muncie, president, and C. F. Gobble, of Purdue, secretary-treasurer.

A new organization, the Indiana Vegetable Growers' Association, came into being when about 200 vegetable producers of the state got together. They elected W. R. Myers, Jr., of Indianapolis, president; Albert Morris, of Crawfordsville, vice-president; Prof. H. D. Brown, of Purdue, secretary; W. S. Roebuck, of Ft. Wayne, treasurer.

The Apple Show held at the Purdue greenhouse attracted bigger crowds than ever before. In the commercial classes Coffing Bros., of Silverwood, Fountain Co., won sweepstakes. W. S. Oberlin, '21, T. J. Mellinger, '21, and C. Mullendore, '24, won in the various students' classes, while Ercell Oberlin, of Hamilton, Ind., won in the high school class.

A feature of the week was the visit of the state legislators. The University turned out in full force to welcome the solons and show them about the campus. The firing of the governor's salute, the all-University parade, the luncheon in Agricultural Hall, and the inspection of the various buildings all helped to make the day an enjoyable one for the capital city visitors.

Indiana dairymen are fighting valiantly in the nation-wide campaign being waged against the scrub sire. This was strikingly shown at the Short Course when the assembled dairymen and dairy students with fitting obsequies actually buried Mr. Scrub Bull, and did honor to his successor, Mr. Purebred. The Indiana State Dairy Association elected W. L. Hanning, of Evansville, president; W. O. Mills, of Mooresville, vice-president; and C. R. George, of Purdue, secretary-treasurer.

The Indiana Jersey Cattle Club elected B. H. Scranton, of Rising Sun, president; Mrs. M. A. Covode, of Westfield, vice-president; and C. Earle Smith, of Indianapolis, secretary-treasurer.

Members of the Holstein-Friesian Association elected B. B. Morgan, of Chesterton, president; D. V. Whiteleather, of Columbia City, vice-president; and H. A. Moss, of Center Point, secretary-treasurer.

Officers elected by the Guernsey breeders in their meeting were: P. H. Crane, of

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Some Dependable Insecticides, and How to Use Them

By Prof. J. Troop,

Head of Entomology Department, Purdue University.

THERE is not a crop grown by the farmer or fruit and vegetable grower but that is subject, at some time during its development, to the attacks of insects. Under natural conditions plants were able to take care of themselves. It was simply a case of the "survival of the fittest." In other words, nature cared for her own. In case any particular kind of insect became too numerous and troublesome, nature immediately sent out parasites to hold them in check. And it is so at the present time to a certain extent, but now everything is grown under more or less artificial conditions. Man has so upset nature's plans that she is no longer able to maintain that equilibrium between plants and animals which formerly existed. One hundred years ago this country was largely in a state of nature. Every species of insect had its particular species of plant upon which it fed, and there was no need of encroaching upon others. Today those conditions have completely changed. The natural food plants have been destroyed and others have taken their places. This has, in many cases, made it necessary for the insects to change their mode of living, and so it frequently happens that they find the new conditions more suitable to their tastes than were the old. And so the farmer, whether he is growing grain or fruit and vegetables, finds himself today unable to raise a crop of any kind to perfection without fighting for it. This has given rise to the modern spray pump and to the multitude of spraying materials which are in more or less common use.

It would be impossible, even if it were desirable, to even enumerate all of these materials in a short article of this nature. Most of them are effective under certain conditions, but what I wish to point out here is a few of the more important ones which have stood the test and which may have a more or less general application. In order to be effective, an insecticide must be so constituted as to be able to do the work required quickly and thoroughly and without injury to the plant or animal. This presupposes a knowledge on the part of the farmer, not only of the character and effect of the material used, but also of the nature and habits of the insect to be combated. He must understand that there are two types of mouthparts in insects, with various modifications to be sure, but so far as he is concerned there are but two types—the biting and the sucking. The first chews its food and takes it into its stomach in a more or less solid condition. The second simply punctures the tissues of the plant or animal and sucks the juices. In other words, the sucking insect takes its food in the liquid form.

This gives rise to at least two classes of remedies, one that kills by being taken into the stomach with the food, and the other which kills by coming in contact with the body of the insect. But it often happens that insects are found in a position where it is impossible, or impracticable to reach them with either of these combinations, as for example the clothes moth, so one must resort to fumigation with certain gases. Insecticides may therefore be divided into three classes, as follows:

Those for chewing insects,
Those for sucking inescts,
Those for fumigation.

Arsenicals.—Thirty years ago Paris green was the principal arsenical poison in use for chewing insects. It is known as the aceto-arsenite of copper, and according to the Insecticide Act of 1910 should contain not less than 50 per cent of arsenious oxid, and not more than 3½ per cent of water—soluble arsenic. It will readily be seen, therefore, that the greater part of Paris green is insoluble in water, simply being held in suspension, and being quite heavy it settles to the bottom of the spray tank quickly unless constantly agitated. It should never be used on stone fruits, and when used on other plants or trees, it should always be mixed with lime or with Bordeaux mixture in order to prevent burning of the foliage.

Arsenate of Lead.—Within the past few

years this has largely taken the place of Paris green in spraying work. The burning qualities are not so marked, thus making it much safer for the amateur to use. Then, too, it has good adhesive qualities, which causes it to stick to the foliage better than does Paris green, and its fineness causes it to remain in suspension much longer. It is put upon the market in both paste and powdered forms. The powder is much easier to mix with water, and one and one-half pounds to 50 gallons of water will be found sufficiently strong for all leaf-eating insects, although for the Colorado potato beetle an additional pound may be added with safety.

London Purple should not be used by the inexperienced person owing to the variability of its arsenic content. One is liable to burn the foliage.

Hellebore is the powdered root of the white hellebore plant and is one of the best remedies for the imported currant worm, as it does not burn the foliage and is easily washed from the fruit. Dust the center of the plants as soon as the leaves are full size.

Contact Sprays.

Lime-Sulphur—For the sucking insects several mixtures are recommended, but the one most generally in use for scale insects, as well as numerous other species, is lime-sulphur. This may be home-made, but as it is very disagreeable to handle, and as it may be had in any quantity from the manufacturers, the latter is generally used. The various spray bulletins sent out by the Experiment Station give directions for diluting the mixture to the required strength before using. These may be had for the asking.

Dry vs. Liquid Lime-Sulphur.—During the past two years experiments have been conducted by the Natural History Survey, Urbana, Illinois, for the purpose of comparing the Dry Sulphur Compound with the liquid in the control of the San Jose Scale. "The results of two years' work with these materials seem to show that some dry sulphur compounds, if used at sufficient strength, are effective in controlling the San Jose Scale." Illinois Experiment Station Circular No. 239.

Kerosene Emulsion.—This is easily made and is very effective on plant lice and other soft bodied sucking insects. It is made by dissolving one-half pound of good laundry soap (or one quart of soft soap) in one gallon of water, after which remove from the fire and add two gallons of coal oil, and agitate until it becomes a creamy mixture. This is the stock solution, and it may be kept for some time, and is always ready for use. For spraying trees in foliage add one gallon of the stock mixture to six or eight gallons of water, the amount of water depending somewhat upon the kind of plant to be sprayed.

Nicotine Sulfate.—It has long been known that the nicotine in tobacco is an effective agent against plant lice and other soft bodied insects requiring a contact insecticide, but it is only comparatively recent that this has been made use of on a large scale. Of these various mixtures the Nicotine Sulfate, or as the trade name gives it—Black Leaf 40—is the most important and the most generally used. As it is highly concentrated a little of it goes a good ways. For example: when used for plant lice it may be diluted one part to 1,000 parts of water. It will keep indefinitely, but it should not be allowed to evaporate. In other words, keep the can closed when not in use.

Fumigants.

It sometimes happens that dwellings become so infested with certain insects that nothing but fumigation will reach them. Grain in bins becomes infested with weevils, flouring mills become infested with the Mediterranean flour moth, or greenhouses become so filled with the white fly that nothing but poisonous gases will reach them. For weevils in grain bins or clothes moths in closets there is nothing better than Carbon Disulfide, which forms a poisonous gas, and, when kept closely confined, will kill any of these insects within twenty-four hours. It must be remembered, however, that this gas is both poisonous and explosive, in the presence of fire; hence must be handled with caution. For flouring mills, elevators, greenhouses, etc., the Hydrocyanic acid gas is more effective as the gas is lighter than air and so will fill the entire space. However, it is one of the most deadly poisons known, consequently it should not be used by inexperienced persons until they have been thoroughly advised by experts.

Don't forget to water the horses regularly. They get thirsty in the winter as well as summer.

Milk and Honey in Vocational Agriculture

By A. C. Norris,

Supervisor of Vocational Agriculture in the Elwood High School.

MR. G. I. CHRISTIE takes great satisfaction in relating his experiences in the receiving line at Washington, D. C., when welcoming the state prize winners who were being rewarded by a trip to our nation's capital. One boy raised the best pig in his state, another the best calf, and another the best acre of corn. Finally he came to one boy who proudly told him that he had raised bees better than any other boy in the state.

Bees are very small animals and one or two are of little importance to a swarm, but if they are the means of getting a boy to enter a high school and take a deep interest in English, Algebra, Farm Carpentry and Farm Crops, they are certainly worth noticing, when a vocational agricultural man is looking for boys who ought to be in his class. Such a boy is now in Elwood High School and is doing well.

Here is the story: His brother enrolled in the vocational work in February, 1920, and took as his projects, corn, potatoes, and a small orchard. While visiting him, the mother of the two boys asked whether I would talk to the other boy, Roy, and get him interested in the work and enroll him in my class. I found that a swarm of bees had recently been captured by Roy and his father and put into a dry goods box, with two sticks nailed at right angles for a sup-

Roy Bagley hiving his first swarm of bees.

port for the honey. I suggested a modern hive for them, and to make a long story short, Roy Bagley and I got an old hive, cleaned it up, put in a new foundation and on a hot day in July made the bees leave their old home and go into their new one. They liked the change and went right to work. Soon Roy heard of another swarm of bees at the home of a neighbor and he got them also. At present he is making modern hives in farm carpentry and expects to have quite an apiary by next September. Roy is a bright boy and exhibited corn and potatoes in our fall show.

As a winter project he is keeping a record of his father's work horses to find what it actually costs for every hour of work each horse does during the year. He has included his own driving horse with which he goes to see his girl on Sunday evenings. Next summer Roy will be working on a man-sized project, such as a ten acre field of corn or five acres of tomatoes, or the hay crop on his father's farm. I predict, however, that his bees will be his greatest pride during the coming season, and his lifetime, because a person rarely becomes tired of bees, we are told. I have three more boys who have bees and Roy is getting more boys interested in them every week. This is not a project which should be pushed to the exclusion of corn, hogs, and poultry, but when two swarms will yield 155 pounds of strained honey, as mine did this past season, I shall feel inclined to include bees in my list of profitable projects for real live vocational boys and girls.

Robert Wittkamper is a real farmer lad, sixteen years old, from whom I am expecting great things. He began keeping a dairy record the first week I was in Elwood and has been at it ever since. As a matter of history I would never have gotten Robert in my class if I had not taken an interest in his cows. A dairy record can begin any time, and as it was June, 1919, when I came to Elwood, I got Robert to testing his cows and keeping a daily record of their production. I did not try to get him to do anything else that summer, but last summer he had a field of corn, a field of potatoes, a patch of raspberries, four additional grape vines and his apple orchard. Next year Robert is going to rent a small farm and run it all by himself in addition to helping his father on his farm. In Farm Carpentry, in sixteen weeks, Robert has made a sack holder, a tool board, a medicine cabinet, a fruit ladder, and some toys for his small brother Moses.

Robert's delight is his dairy herd. He announces the birth of a new member in his dairy herd with as much pride as the average farm boy does the birth of a baby brother. He knows how much each quart of milk costs and how much it brought when sold. He knows how much butterfat each cow tests and he can balance their rations as well as an official cow tester. Robert's enthusiasm is contagious, and like Roy with his bees, he is getting other boys to keep dairy records. I have asked him to get members for our Dairy Record Club and he is bringing in results. I hope he may be able to revolutionize the dairy industry around Elwood. We certainly need some active work done along this line around here, as the milk situation in Elwood is very primitive indeed. I am leaving it to Robert and Joe Green to get something started along this line. Elwood needs the following along dairy lines:

1. An inforced milk, cream, butter, and ice cream ordinance.
2. A dairy inspector to instruct and inforce the above ordinance.
3. A local Pure Bred Dairy Association.
4. A Cow Testing Association.
5. An Annual Dairy Products Show.
6. An Annual Dairy Cattle Show.
7. A Pure Bred Dairy Calf Club.
8. A Dairy Record Club for boys and girls.

This is quite a task for Robert, but he is going at it with a vim which I know will produce results.

I have spoken of Joe Green. He is a boy who has no cows on their small place, but he is keeping a daily record of Vern Moore's herd. Vern is one of Elwood's milkmen who lives across the road from Joe. He milks ten cows and is very much interested in scientific dairying but he never had agriculture in school. He can't balance a ration, so he feeds "So and So's Perfect Cow Meal." He is anxious to have Joe teach him how to take cottonseed meal, wheat bran, corn meal and ground oats and mix a balanced ration for each cow. Joe is anxious to learn how to become a cow-tester and then a herdsman for some one with a dairy.

The 1921 State Corn Show

JOSEPH C. ISLEY, of Shelbyville, Ind., won the grand sweepstakes honors of the 1921 corn show held at Purdue in connection with the farmers' annual short course. The winning exhibit was a ten-ear sample of Johnson county white corn, the same ten-ear sample which won first honors in section four at the recent International hay and grain show at Chicago. Ed Lux, also from Shelby county, won the honors last year with the same kind of corn. Mr. Clarence Grenard, of Hillsboro, Fountain county, who had the best ten-ear yellow sample of the show, and Mr. Fred Kalkmeir, Waldron, who had the best ten-ear sample of mixed corn, were Mr. Isley's closest competitors for grand sweepstakes honors.

V. L. Manuel, of near Crawfordsville, won sweepstakes in the single ear class with Reid's Yellow Dent corn. The same kind of corn shown by George Lewis, of Wingate, won first place last year.

George J. Sauerman, Crown Point, repeated this year by winning sweepstakes honors in the wheat class, and William Fritch, Corunna, won sweepstakes on oats again this year.

Walter & Prussel, of Bluffton, won sweepstakes honors on soybeans, a new class in this year's show.

Sweepstakes honors in the five sections of the state on corn were as follows: First section, Glen Smiley, Rochester; second, Herman L. Miller, Bluffton; third, Joseph C. Isley, Shelbyville; fourth, R. L. Heilman, Hope, and fifth, Earl W. Hammond, Rockport.

The special county agent prize for the largest number of exhibits in each section went to Walter V. Kell, LaFayette, section two; R. G. East, Shelbyville, section three; James Kline, Bedford, section four; and H. D. Jackson, Rockport, section five.

The show had about three hundred and fifty entries and was larger by about eighty or ninety entries than any previous show held in the state. Prof. A. T. Wiancko, of Purdue, judged the corn and Professor Fisher the small grain and soybean samples. The samples this year were much better matured and in better seed condition than those of former shows. There were also many new exhibitors, some of whom won important prizes. The number of exhibits in the small grains class showed a marked increase over last year. There were nineteen entries in the soybean class, which was a new feature of the show this year.

The winners of the first, second and third prizes in each class by sections are as follows:

Section I.

Yellow Corn—10 Ears.

1. Glen Smiley, Rochester.
2. Julius G. Henry, Winamac.
3. Noah Gerig, Auburn.

White Corn—10 Ears.

1. W. B. Henry, Winamac.
2. J. A. Warren, Kouts.
3. Julius G. Henry, Winamac.

Mixed Corn—10 Ears.

1. P. E. Hudson, Howe.
2. No entry.
3. No entry.

Single Ear of Corn.

1. Noah Gerig, Auburn.
2. Seral Warren, Kouts.
3. Geo. J. Sauerman, Crown Point.

Wheat.

1. Geo. J. Sauerman, Crown Point.
2. No entry.
3. No entry.

Oats.

1. Wm. Fritch, Corunna.
2. Geo. J. Sauerman, Crown Point.
3. Noah Gerig, Auburn.

Soybeans.

1. Noah Gerig, Auburn.
2. Glen Smiley, Rochester.
3. Geo. J. Sauerman, Crown Point.

Section II.

Yellow Corn—10 Ears.

1. H. L. Miller, Bluffton.
2. W. D. Littlejohn, Kentland.
3. Marvin Thornburg, Winchester.

White Corn—10 Ears.

1. Eugene Troyer, Lafontaine.
2. A. F. Troyer, Lafontaine.
3. Tully Anson, Huntington.

Mixed Corn—10 Ears.

1. Arthur Mundell, Frankfort.
2. Tully Anson, Huntington.
3. J. M. Mundell, Frankfort.

Single Ear.

1. T. B. Milligen, Goodland.
2. Keith Johnson, Goodland.
3. Frank Rust, Lafayette.

(Continued on page 224)

THE PURDUE AGRICULTURIST

Published monthly during the school year, by Agricultural Students of Purdue University, LaFayette, Indiana.

MEMBER OF AGRICULTURAL COLLEGE MAGAZINES

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The purpose of THE PURDUE AGRICULTURIST is to disseminate the latest scientific knowledge concerning Agriculture and Home Economics, to incite the young people of Indiana to a greater desire for training in Agriculture and in the industrial pursuits, to publish matters of interest concerning the Purdue School of Agriculture and the Purdue Experiment Station, and to afford opportunity to the students for training in Agricultural journalism.

IS YOUR SEED CORN GOOD?

Numerous individual ear tests at the Station have showed that much of the Indiana seed corn that looks perfectly good will not grow. This conclusion is also supported by reports from over the State. Last fall, due to unfavorable weather, much of the corn was gathered late and it was in an immature condition. Consequently, it is extremely important that farmers make the individual ear test if they wish to assure themselves of viable seed.

No farmer can afford to neglect to treat his seed oats when the small expense will mean an average increase in his crop of about 12 per cent. The dry method is a great labor saver. One pint of formaldehyde mixed with one pint of water is enough to treat seed for twenty acres. This is applied with an atomizer sprayer as the seed is shoveled about, and all parts are thoroughly reached, but the oats should not be moist enough to form balls when compressed in the hands. It is then covered FIVE HOURS, with disinfected sacks, to keep the fumes within and at work. Sowing may follow immediately, or it may be delayed for some time. In the wet method, one pint of formaldehyde to forty gallons of water is used, and the oats are sprinkled with this solution at the rate of one gallon to about a bushel and a half of oats. The oats should be covered for at least two hours or over night, and should then be THOROUGHLY DRIED.

THE FARMER'S FEDERATION AND MARKETING.

President J. R. Howard, of the American Farm Bureau Federation, in accordance with the plans announced at the second annual convention of the organization, held in Indianapolis, last December, has appointed a committee to investigate and study livestock marketing. This committee will make a detailed investigation and report later. This is a phase of farm business which has long warranted thoroughgoing study. We hear on every hand contentious arguments, charges and counter-charges that the farmer is not getting fair prices and also that the customer is being over charged; that the market is manipulated by packers, that there seems to be, however, a lack of any authoritative information and understanding as to fluctuations of prices, supply and demand. Not only the farmer but also the general public demand to know "What Happens in the Dark," if anything. When the actual overhead of the packer and retailer have been determined their profit can be set with justice. The American farm has opened the way for a big piece of work.

The committee has a large and difficult undertaking. Farmers should not expect too much. Our present system of marketing livestock is the result of 50 years' experience. Some of the machinery may be worn and antiquated. It may need overhauling, but the machinery should not all be knocked down at once. If the committee in time can only establish confidence on the part of the

producer and consumer it will have done much for the industry which it represents.

REJUVENATE THE OLD ORCHARD.

At this time of year, while trees are in a dormant condition, is the logical time to trim and rejuvenate the old orchard. Naturally enough on the average Indiana farm where so much work must be done, the orchard suffers for want of proper care. During the lax winter season, however, a few comfortable days can usually be found for work in the orchard which will yield manifold returns next summer. One Indiana man had last winter practically decided to cut down the peach orchard on the place since it was badly infested with San Jose scale, and many limbs were dead. Quite accidently, he happened to read a bulletin issued by one of the experiment stations which described the possibilities of reclaiming old trees. Following these instructions he did not cut them down but trimmed them back severely, eliminating all the dead parts. Next season he was rewarded with a vigorous new growth on the old stubs. Since that time he has realized several good crops, which not only supplied his own wants, but yielded enough to supply some of his less fortunate neighbors. And this came from a plot which he thought absolutely useless. Before abandoning the old orchard completely, look it over again and investigate the possibilities of its reclamation. It may be worth your while.

CLEAN UP TIME.

On every farm, large or small, a certain amount of unsightly debris accumulates during the year, presenting a problem of removal that must be met in the slack time of the year. The ancient Egyptian, after the harvests were over and before the next season's planting, simply opened the dikes of the Nile river and allowed its cleansing waters to overflow his land, enriching it with rich alluvial soil, and carrying off the filth, dirt and debris that had accumulated since the last planting season. And historians tell us that those well kept farms of the Nile valley were the most successful farms in the East.

Have you ever traveled along a country road and tried to pick out the successful farmers from the unsuccessful ones? When you saw a farm with some unpainted ramshackle buildings on it, with piles of filth in the stable yard, with disordered piles of lumber, a broken fence or two, or a plow lying on its side under a tree, what was your impression of the owner? Then, as if to make the contrast greater, you saw the well ordered, well cared for farm next; you are willing to gamble that this owner is successful.

Indiana has always prided herself on the well cared for condition of her farms. But during the year, odds and ends are likely to accumulate, a fallen fence may be overlooked in the press of other things, or unsightly debris appear in the yards, and now is the time to remove them. These crisp sunshiny days that come along are the ones to use in cleaning up. "Turn on the water" and let's give the farm the successful look it is such a pleasure to see. You will benefit not only your community, county, and state, but also yourself in the pleasure of owning a successful farm that speaks for its owner in terms of success.

SOY BEANS.

The demand for soy beans has been increasing each year so that it is still very difficult for seed houses and seedmen to supply the farmers.

The Corn Belt Soy Bean Association, which is of recent formation, has done much to hedp remedy this condition and produce seed of acceptable purity and quality. Farmers of Indiana who have produced certified seed which can well be used for distribution in this state are:

Lloyd H. Maddus, Medaryville, Hollybrook; Geo. Stout, Medaryville, Hollybrook and Ito San; Roy Smiley, Odon, Blacks; Ralph Lowman, Cutler, Hollybrook; R. D. Clark, Medaryville, Hollybrook; Ward Parnell, Greenfield, Hollybrook; C. A. Henry and Fout Bros., Camden, Hollybrook; W. R. Butler, Kokomo, Hollybrook; Joe Raub, Ellettsville, Hollybrook; Morrison De Prex, Shelbyville, Hollybrook; P. Turner, Lebanon, Ito San and Hollybrook; Walter Sturdevant, Noblesville, Hollybrook.

This certified seed is not only pure but is true to variety so that a farmer knows exactly what he is buying. The Association has decided that the price this year should range from $4 per bushel for the poorer quality and the mixed beans, to $6 for the certified seed.

A Successful Year for the Five Acre Contest Work

By R. S. Thomas.

THE development of the Five Acre work has slowly advanced since 1914 and this year the enrollment and interest has surpassed any other preceding year since its organization. In 1917 there was but one man who produced 100 bushels of corn per acre. In 1918 four were successful in raising 100 bushels of corn per acre. In 1919 twenty-four men successfully reached the 100 bushel mark, while this year forty-seven men have raised over 100 bushels of corn per acre and will be presented with gold medals by the Indiana Corn Growers' Association.

Prize winning field in Five Acre Corn Contest work in Tippecanoe County. Notice the number of men interested in the Five Acre work. It is this kind of demonstrational work that makes the contest worth while.

Four hundred and fifty-nine contestants in fifty-four counties have completed the work. One hundred and thirty have raised 75 to 85 bushels of corn per acre on five acres, and each will be presented with a bronze medal, one hundred and forty-six have produced over 85 and under 100 bushels and will receive a silver medal, while forty-nine have been successful in reaching or surpassing the 100 bushel mark and will receive a gold medal.

Mr. William H. Baker, of Greene County, again holds the record for the highest yield, producing 128.8 bushels per acre on five acres. Mr. Baker produced the highest yield last year. Mr. J. A. Warren, of Porter County, was a very close second, producing 127.2 bushels per acre. Mr. Warren deserves a great deal of credit for producing this yield due to the fact that he raised it on land which he cleared and built up to a high state of production. Mr. George M. Quick, of Union County, holds third place with a yield of 117 bushels per acre.

Twenty-six counties in the state are represented by one or more 100 bushel corn yields. These counties extend from the extreme north to the extreme south and from the east to the west, showing that when the best methods are put into practice, most any county is capable of producing 100 bushels of corn per acre.

Out of thirty-three contestants in Tippecanoe County, 23 medals were obtained—7 bronze and 16 silver, or 70 per cent of all contestants winning medals. This is the best record made by any county in the state this year. Delaware, Franklin, Henry and Huntington counties have each 4 gold medals to their credit.

The average yield of the total number of contestants is 81 bushels per acre, while the average yield of the medal men is 88 bushels per acre. The estimated average

yield of corn per acre in Indiana is 40.5 bushels.

The past year has been very favorable from the standpoint of weather conditions in most sections of the state although there were extreme droughts in some localities. This has somewhat lowered our enrollment. However, a larger percentage of contestants have completed the work this year than for any previous year. Each five acre plot has served as a demonstration for local communities from the standpoint of cultivation, fertilization, good seed corn, or some other controllable factor limiting corn production.

At a recent meeting of the Executive Committee of the Indiana Corn Growers' Association it was decided to form a permanent 100 Bushel Corn Club to broaden and strengthen the corn interests in the state. Requirements are that each member should have officially produced 100 bushels of corn per acre in the Five-Acre Corn Contest.

Wm. H. Baker—128.8 Bushels Per Acre.

Methods Used in Producing My Prize Winning Yield in the Five Acre Corn Contest.

By Wm. H. Baker.

"The soil on which this corn was raised is a light sandy loam. It has been in bluegrass pasture for twenty years, and on this stock had been grazed. In addition to this, a considerable amount of manure had been spread. The pasture was broken in the fall of 1917 and in the spring of 1918 was plowed to corn. In the fall of 1918 it was sown to wheat and big English clover was sown on this in the spring. The clover was topped in the fall of 1919, the seed being removed, and in the early spring of 1920 this was disked up and turned under to a depth of ten inches, and planted in corn.

"The ground was let lay in the rough and before it was worked, four tons of limestone per acre were spread. Along with this was spread 150 pounds of acid phosphate per acre. The acid phosphate was applied with a wheat drill, as this puts it over the entire field.

"The ground, now, was double disked, rather than harrowed, for this leaves a loose seed bed rather than a packed bed, as would be the case with the harrow. I also prefer sowing the fertilizer early, as this gives it a chance to get thoroughly mixed with the soil.

"The corn planted on the five acre plot was Johnson County White that had been field selected the year before and stored in a dry, cool place. This corn was tested during the winter by the rag doll tester. Corn of 100 per cent germination was all that was used.

"The corn was plowed May 26th, a disk harrow being used in front of the drill. The corn was planted in rows three feet apart and sixteen inches in the row. There were furrow openers on the planter and the corn was planted about four inches under the surface but covered to a depth of about one and one-half inches.

"The first cultivation was with a weeder June 14th. After this the corn was cultivated once every week until August 3rd. Either an eagle claw, a weeder, or a planter wheel being used.

"I have found that surface cultivation (and keep this up as long as it is necessary to conserve the moisture) is what is needed to produce good corn. I attribute the success I have had in the corn growing work to the facts that my ground is in good fertile condition, that I used only 100 per cent seed corn, and to the surface cultivation. I am indebted in a large measure to Purdue University and the County Agent for help and advice on the work."

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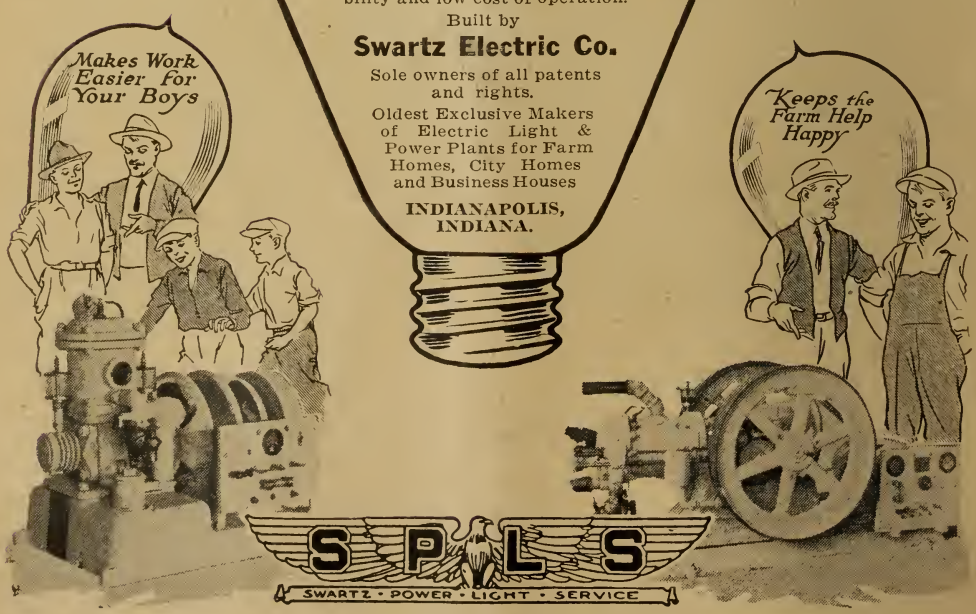

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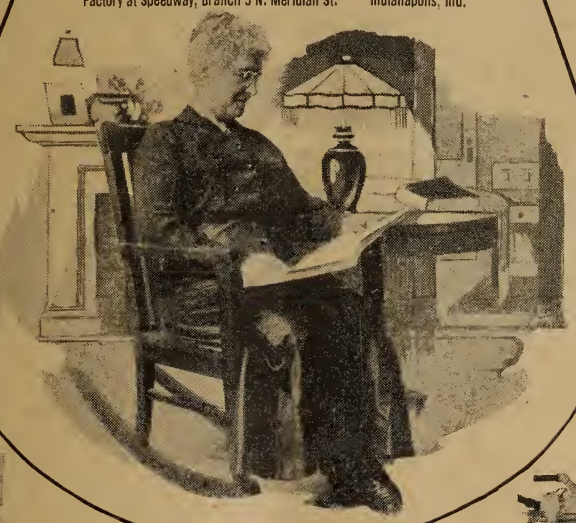

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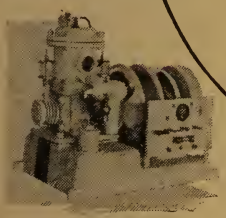

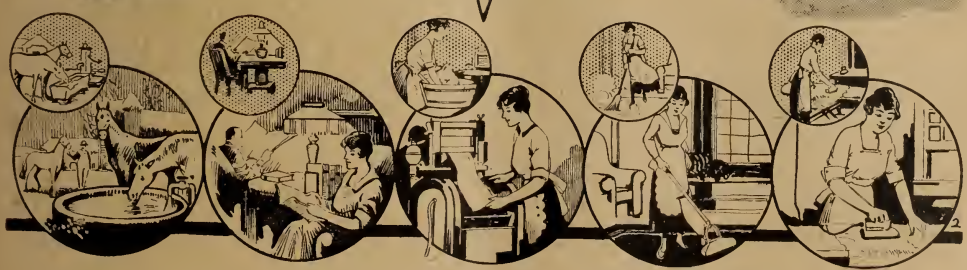

How I Won My Gold Medal in the Five Acre Corn Contest Work.

By J. A. Warren.

"The land is a strip of black sandy loam with considerable clay in the subsoil down to three to five feet. Under this sand or gravel. The land was too wet for cultivation until the open ditch was deepened six years ago. The grass was a mixture of wild lowland grasses and sedges, which had been used for pasture for many years. It had never been plowed.

"In the spring of 1915 I plowed this field and planted corn. The crop was esti-

J. A. Warren—127.2 Bushels Per Acre.

mated at 60 bushels per acre, but as it was pastured off I did not know just what the yield was. The winter following four tons per acre of FF limestone screenings were spread, and in June alfalfa was sown. That year only a little hay was secured on account of the severity of the leaf spot, but for the three years following the estimated average annual yield was five tons per acre. Last spring eight large spreader loads per acre of cattle and sheep manure from an open shed were used. The ground was plowed about 8 inches, disked four times, harrowed once. Three hundred pounds per acre of ½-11-5 was put in with the grain drill just before planting. The planting was done with a 3′ 6″ x 3′ 6″ check rower, but was so poorly done that crossing was impossible. The planting also was irregular but averaged 3 grains per hill. The seed had been carefully tested, and if any one of the six grains was weak the ear was discarded.

"After planting, a common spike tooth harrow was used once. It was cultivated twice with a six shovel cultivator and twice with the towers.

"In June a bad sand storm did much damage to this field as it did to nearly all the corn in the vicinity. About the 25th of August hail damaged the corn considerably. The second cultivation was carelessly done and a very large proportion of the plants were partly covered with earth. This caused the leaves to curl and resulted in many barren or deformed stalks. For some reason smut was unusually bad. I estimate the damage from smut alone at 10 per cent.

DEAN SKINNER ON NATIONAL FARMERS' STOCK MARKETING COMMITTEE.

J. H. Skinner, Dean of the School of Agriculture and head of the Department of Animal Husbandry, has been made a member of the National Farmers' Live Stock Marketing Committee of the American Farm Bureau Federation according to information given out at the headquarters of the Indiana Federation of Farmers' Associations yesterday.

The committee which is composed of 15 members, was appointed by J. H. Howard, president of the American Farm Bureau Federation on the recommendation of the temporary committee which was named at the live stock marketing conference held in Chicago in October. The permanent committee will investigate live stock marketing conditions and may devote study to other live stock problems.

W. A. Cochel, Kansas City, Mo., who formerly was connected with the Agricultural Experiment Station at Purdue University, also is a member of the committee. Mr. Cochel is now the representative of the American Shorthorn Breeders' Association in the Southwest territory.

A new Jersey record for junior four-year-old cows in Indiana has been set by Majesty's Little Maiden. She produced 11,986 pounds of milk and 676 pounds fat, and is owned by Ainsworth Bassett, of Syracuse, Indiana.

Seed Certification Work in Indiana

By W. A. Ostrander,

of the Extension Department. Chairman of the Certification Committee of the Indiana Corn Growers' Association.

CERTIFICATION of small grains, soybeans and corn started in Indiana in 1920 due to the interest and demand of farmers in the state for sources of good, reliable seed grain of the above classes acclimated to Indiana conditions.

The work is carried on under the auspices of the Indiana Corn Growers' Association which has a certification committee for the active operation of the work. This committee outlines the plan for certification which is approved by the executive committee of the Indiana Corn Growers' Association and then put in active operation.

In sending out a call to the men of the state that certification was available for their grain, many men responded with applications for this work. All men were cautioned to look over their fields carefully before an inspector was sent out that they might have a reasonably good chance to pass. About one-fourth of the applications were withdrawn before an inspector was sent out due to the fact that the men found some shortcomings in their crops.

The general points in the work were set out about as follows: All wheat should have less than one per cent of discernible mixture, less than one per cent of loose smut, and less than one-tenth per cent stinking smut, and no rye, cheat, cockle or onion. Rye should be well filled out and true to its variety, and should not contain more than one per cent of ergot. Oats and barley should also be true to variety and free from mixtures. All the standing grain should show good quality and not be badly lodged or show any small inferior heads. In the case of soybeans, the growth of the plant and its blossom determine largely its variety, and must contain less than one per cent of mixture. Corn should show less than one-tenth of one per cent of mixture. The field inspection is made while the crop is growing, consisting of a careful survey of the field. The second inspection in the case of small grains and soybeans is made by threshed clean samples sent in to the office, and if these are true to variety and show good quality the final certification is made. In the case of corn a second trip is made for inspection in the seed house. All seeds must show reasonably good germination.

The certification work was put on a self-sustaining basis. The charge for small grains and soybeans was $8 for any acreage up to twenty acres and 25 cents for each additional acre. For corn there was a field inspection fee of $8 for twenty acres and 25 cents for each additional acre, and a seed house inspection fee of $8 for any quantity up to 200 bushels and $1 extra for each additional 100 bushels. It was the opinion of the association that the men receiving the benefit of this work should be willing to stand the expenses of it. This last year in Indiana there was no certified pedigreed seed but all certified improved seed. This seed was sold about as follows: Wheat averaged from $3 to $3.50 per bushel, and practically every bushel that was certified was sold. Only in one case did the man dispose of part of his crop too quick to take advantage of all the seed. A total of 8550 bushels of wheat was certified, with 2025 bushels of rye, 6215 bushels of oats, and 250 bushels of spring barley. Nineteen men have had soybeans certified with probably a total of 3400 bushels. The total number of bushels of corn has not yet been ascertained.

Just as soon as the fields were certified and the samples sent in the test weight per bushel was taken and this together with the man's name, address, variety, and number of bushels that he had for sale was mimeographed and sent out to all county agricultural agents, elevators and millers, so that they might be mediums of advising farmers where good seed could be obtained. Seven varieties of wheat were certified this last year. All seven varieties are soft red winter wheats adapted to Indiana conditions and all have practically the same milling quality. Rosen rye was the only rye certified with three varieties of oats. It was very gratifying to know that farmers of Indiana were ready for such a movement from the way they bought the wheat that these

(Continued on page 232)

Plans for the 1921 Hatching

By F. D. Brooks,
Instructor in Poultry Husbandry.

THIS is the time every poultry keeper should be making plans for the hatching season.

We expect the breeding stock has already been selected, if not, the most vigorous and best producing hens for the past year should be separated from the rest of the flock and used as the breeding pen. The males may be placed with the hens at any time now, ten days previous to saving eggs being considered sufficient time to secure fertility.

The incubators should be gone over carefully to make sure that they are in good working order. A few extra burners, wicks and thermometers should be kept on hand. Make any necessary alterations in the room in which you are operating your machine so that you will have a well ventilated room, free from all drafts. The temperature should be fairly uniform and if possible 30 to 40 degrees lower than your temperature for incubator. If you are buying an incubator, place your order immediately. You will need an incubator if you are planning to raise more than one hundred chicks this season. Any reliable incubator company will sell you a machine that will give satisfactory results if you do your part in contributing good eggs and care.

Make your plans now to hatch some chicks in March and hatch the balance of what you need in April and May. The chicks hatched at these times will begin to lay the following October or November if given good care and feed. Eggs in October and November sell for ninety cents to one dollar per dozen. You will find a great deal of satisfaction in planning the number of hatches, the eggs to be set in each hatch, and the chicks hatched, and then checking your actual results as each hatch comes off. Our usual expectations are these:

Egg production from breeding stock in February, 25 per cent; March, 40 per cent; April, 50 per cent.

One-fifth or more of these eggs should not be set because of small size, poor shape or color, or cracked, weak, or rough shells.

One-half of the eggs set will hatch.

Between five and six eggs must be set for each mature pullet in the fall.

The problem most poultry keepers are thinking about at this time is how to reduce that usual loss of fifty eggs on each one hundred set. The fifty eggs that do not hatch are usually a total loss and represent an enormous economic loss and food waste when we consider the millions of eggs set each year. The chief cause of this loss may be traced to one of two sources, either the breeding stock or the operator or both. Under each of these factors we have the following important things to consider:

First: The Breeding Stock.

Condition: Only healthy, strong, well fleshed birds that have reached physical maturity can be expected to give fertile hatchable eggs. Experimental work at many colleges has proved beyond doubt that the weak, immature, poorly fleshed bird usually lays eggs that hatch poorly, and the few chicks that are hatched are difficult to raise and make undesirable hens at maturity.

Individuality. Work done at Storrs College, Connecticut, shows that even among the good birds there is considerable variation in their ability to produce fertile hatchable eggs when kept under the same conditions and mated to the same males. We can divide any flock into three groups: first, those that lay infertile eggs throughout one season but may lay fertile eggs in the next season; second, those that lay fertile eggs, but the chicks fail to hatch; third, those that lay fertile eggs that nearly always hatch.

Here are some of the results:

The four-year average hatching results for a flock of 341 hens showed that 181 eggs were set for each 100 chicks hatched.

A flock of 108 **selected** hens for one season required 146 eggs set for each 100 chicks hatched.

A more rigidly selected flock of 67 hens for one season required 126 eggs set for each 100 chicks hatched.

In comparing the four year average with the results from this last flock there was a saving of five cents per chick on the cost of eggs alone when hatching eggs are worth ten cents each. The March hatch of

(Continued on page 238)

ARCADIAN
Sulphate of Ammonia

Absorption of Ammonia by Soils

Sulphate of Ammonia is a highly soluble fertilizer and when added to a moist soil quickly dissolves and undergoes rapid and thorough distribution. Should it remain in the soil in this soluble condition, it would be leached away during periods of heavy rainfall, as are nitrates.

Fortunately, however, chemical changes take place in the soil solution, with the result that the ammonia is split apart from the Sulphate radical and is held firmly by the organic and clay constituents of the soil. Even our most sandy agricultural soils contain sufficient clay and organic matter to hold a normal application of ammonia.

From this fixed or insoluble condition the ammonia is changed into the nitrate form by the soil bacteria, and is then available as plant food. Although it is possible for the nitrogen to be washed away after the change to nitrate, very little is actually lost because the conversion of the nitrogen from ammonia to nitrates proceeds much in accordance with the needs of the growing crop and but small excess is ever present.

The drainage loss experiments of the Rothamsted Experiment Station, as given in "The Book of Rothamsted Experiments," by A. D. Hall, indicates the comparative losses of nitrogen as nitrates from the Broadbalk fields fertilized with ammonia salts and with nitrate salts. The pounds of nitrate nitrogen lost in the drainage water from the time of spring sowing of grain to harvest was as follows:

Plot 3—Unmanured ..... 1.7 lbs.
Plot 7—100 lbs. nitrogen from ammonium salts.....18.3 lbs.
Plot 9—100 lbs. nitrogen from nitrate salts.....45. lbs.

This ability to withstand leaching makes *Sulphate of Ammonia* an especially desirable fertilizer for light soils and for crops which must be fertilized at a time preceding periods of heavy rainfall.

New York
Baltimore

The Barrett Company

Atlanta
Medina, O.

AGRICULTURAL DEPARTMENT

Inquiries From Our Readers

Let Us Help Solve Your Problems—Purdue Stands for Service.

H. W. L., of Elkhart, says: "We shall need some early feed next summer for hog feeding, and contemplate sowing barley. Would like to know the best variety adapted to this locality for yield, how much to sow per acre and what time to sow.

Answer: A mixture of barley and oats, one and one-half bushels of each, will furnish a good pasture and come on as early as anything sown in the spring. Silvermine oats and Success Beardless barley or Oderbrucker barley are well adapted to your climatic and soil conditions. If corn stubble ground is used it should be prepared by disking and the seed drilled. This should be done just as early in spring as the ground can be worked. The last week of March is often favorable for such sowing.

Mr. W. W. G., of Henry county, asks for information about growing broom corn.

Answer: Broom corn is adapted to any good corn land. It should be planted like corn except closer in the row. Stalks should stand about six or eight inches apart in the row. Four pounds of seed is enough to plant an acre. Cultivate the same as corn. The brush is cut when the seed begins to harden. The cut brush should be cured in a well aerated shed, and when dry the seed removed and clean brush packed in bales for market.

Question: What is a good ration for laying hens?

Answer: The standard Purdue ration for laying hens is:

Grain Mixture	Dry Mash
10 lbs. corn	5 lbs. bran
10 lbs. wheat	5 lbs. shorts
5 lbs. oats	3½ lbs. meat scraps

The grain mixture is scattered in the litter morning and evening and the mash is hopper fed. Grit, oyster shell, green feed and water are also fed in abundance.

Question: Where may literature be obtained for the School Lunch Project?

Answer: The following bulletins furnish excellent suggestions for the School Lunch:

The Lunch Hour at School, Department of Interior, Bureau of Education.

Diet for School Children, Purdue University.

School Lunch, Purdue University.

Hot School Lunch Project, Michigan Agricultural College.

Rural Hot Lunch, N. Dakota Agricultural College.

Suggested Plans for the Serving of Lunches in Centralized Schools, Ohio State University.

Fertilizer But No Lime for Potatoes.

"What kind of fertilizer would you use on ground for a good yield of potatoes and how much. What kind of lime would you use and how much, and when do you use it to sweeten the ground for potatoes?"—G. Z., Grant county, Ind.

Under the conditions prevailing before the outbreak of the European War we would have recommended a mixed fertilizer for potatoes on the ordinary types of soil that had not been well manured. At the present time, however, with nitrogen and potash prices so very high, phosphates are about the only fertilizers that can be used at a profit on ordinary soils. I would suggest 400 pounds per acre of high grade acid phosphate, thoroughly worked into the surface soil shortly before planting potatoes.

I would not recommend the liming of land just before planting potatoes. If the land is acid and in need of liming, lime should be applied for some other crop in the rotation. Direct applications of lime for potatoes may be harmful in encouraging the development of potato scab. The potato is not sensitive to a reasonable amount of soil acidity. A year or two after a soil has been limed, potatoes may be safely planted and increased yields may be expected as a result of the liming without any further danger of increasing potato scab, unless the soil has been made actually alkaline.—A. T. Wiancko, Purdue Experiment Station.

Feed your skim milk to your older calves. They will fare almost as well, and the whole milk is very valuable now.

"I was the first one to install a Perfection Milker in this vicinity and now I understand there are 115 Perfections around here."
—Edgar L. Clason.

You'll Always Be Glad You Got A Perfection

YOU'LL wonder how you ever got along without it, and wouldn't dream of going back to hand milking. That is what any Perfection owner will tell you when he congratulates you on your choice of the Perfection Milker.

There are many reasons why you will be delighted with your Perfection. It wins your cows from the start. Cows like the Perfection because it is nature's way of milking. The gentle suction followed by a downward squeeze, followed by a period of rest is just like the calf's way of milking.

Dairymen who have used the Perfection for years have found it pays for itself in less than a year in savings on wages. They are delighted in relief from drudgery. They know the Perfection gets more milk.

Just such satisfied owners as they have made possible 115 Perfections in one neighborhood—a tribute to a better way of milking. Get a Perfection and you will always be satisfied with your choice.

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We have a copy of the book, "What the Dairyman Wants to Know" waiting your name and address. Write today! We'll also send the names and addresses of Perfection owners near you. Why Milk By Hand? Users unanimously endorse Perfection.

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Lower Prices. Wherever possible we have reduced the price of seeds by the pound and have increased the number of seeds contained in the packet. You will find much lower prices in Burpee's Annual for 1921.

If you are interested in gardening, Burpee's Annual will be mailed to you free. Write for your copy today. Just tear off the coupon and fill in the space below.

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Gentlemen: Please send me a **free** copy of **Burpee's Annual.** 3

Name.....

Street or R. F. D.....

Postoffice.....State.....

(Continued from page 211)

Wheat.

1. John R. Brown, Lafayette.
2. Alexander Thompson, Lafayette.
3. Oscar Strole, Brook.

Oats.

1. Will E. Wellman, West Point.
2. Harry Stewart, Romney.
3. M. A. Mundell, Frankfort.

Soybeans.

1. Walter & Prussel, Bluffton.
2. Harry E. Shrock, Kokomo.

Section III.

Yellow Corn—10 Ears.

1. Clarence Grenard, Hillsboro.
2. John W. Ulrey, Attica.
3. Ed Lux, Waldron.

White Corn—10 Ears.

1. Joseph C. Isley, Shelbyville.
2. Roy Clore, Franklin.
3. Webb Isley, Flat Rock.

Mixed Corn—10 Ears.

1. Fred Kolkmeir, Waldron.
2. A. F. McCain, Waldron.
3. C. A. Brown, Franklin.

Single Ear.

1. V. L. Manuel, Crawfordsville.
2. Joseph C. Isley, Shelbyville.
3. Clarence Grenard, Hillsboro.

Wheat.

1. Joseph C. Isley, Shelbyville.
2. A. F. McCain, Waldron.
3. Geo. R. McCain, Waldron.

Oats.

1. Joseph C. Isley, Shelbyville.
2. Webb Isley, Flat Rock.
3. Geo. Dales, Dana.

Soybeans.

1. W. W. Means, Shelbyville.
2. R. F. Scott, Edinburg.
3. Walter Sturdebant, Noblesville.

Section IV.

Yellow Corn—10 Ears.

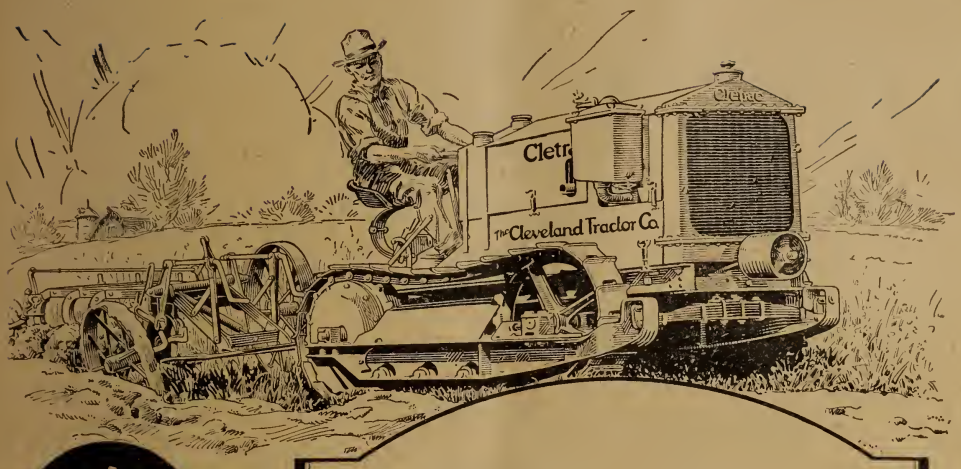
1. R. L. Heilman, Hope.
2. James J. Strasberger, Greensburg.
3. S. S. Fulton, Letts.

White Corn—10 Ears.

1. R. L. Heilman, Hope.
2. Elmer Softon, Greensburg.
3. J. D. Hull, Flat Rock.

Mixed Corn—10 Ears.

1. Fred W. Harting, Bicknell.
2. Elmer Softon, Greensburg.
3. No entry.



First in the Fields

Cletrac Farmers A Week Ahead In Spring

CLETRAC farmers are first in the fields every year. Even a late wet Spring doesn't worry them —their Cletracs get right into the fields and start the work a week ahead of their neighbors.

Cletrac's tank-type tracks ride easily over the soft, wet ground. No power is lost through digging in or miring in the soggy spots. But Cletrac jumps right into its fast, steady pace the first day out and keeps ahead of the work right through the year.

Agricultural students should know how Cletrac reduces the cost of raising farm produce. We will gladly send you a copy of "*Selecting Your Tractor.*"

SPECIFICATIONS

Horsepower: 12 at drawbar, 20 at belt pulley.
Length: 96 inches.
Width: 50 inches
Height: 52 inches.
Weight: 3420 pounds.
Turning Circle: 12 feet.
Traction Surface: About 800 square inches.
Center to Center of Tracks: 38 inches.
Belt Pulley: Diameter 8 in., face 6 inches.

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"Largest Producers of Tank-Type Tractors in the World"

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TANK-TYPE TRACTOR

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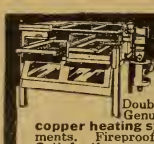

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Heat automatically controlled by patented "revolving chute". **Cannot overheat, cannot underheat.** Double walls equal thickness, double doors. Genuine California redwood. **Heavy 14oz. copper heating system.** Highest grade tested instruments. Fireproof, protected by underwriters' label. **Satisfaction guaranteed or money back.** Thousands in use. 125 to 500 egg capacity. Reduced prices.

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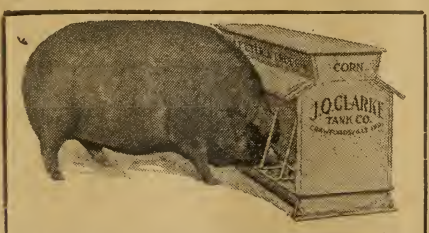

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J. Q. CLARKE TANK CO.

N. Walnut St., Crawfordsville, Ind.

Single Ear.

1. Verdis Fox, Burney.
2. R. L. Heilman, Hope.
3. Elmer Softon, Greensburg.

Wheat.

1. Henry Boyee, Terre Haute.

Oats.

1. C. A. Colglazier, Mitchell.

Soybeans.

1. Sam Paul, Heltonville.

Section V.

Yellow Corn—10 Ears.

1. Albert McGrain, Corydon.
2. Earl W. Hammond, Rockport.
3. J. A. McCarty, Ft. Branch.

White Corn—10 Ears.

1. Earl W. Hammond, Rockport.
2. Marshall Almstead, Evansville.
3. Josh Weatherhoft, Rockport.

Mixed Corn—10 Ears.

1. Earl W. Hammond, Rockport.
2. J. A. McCarty, Ft. Branch.
3. Josh Weatherhoft, Rockport.

Single Ear.

1. Earl W. Hammond, Rockport.
2. Fred Freimiller, Mt. Vernon.
3. Earnest Stateiler, Rockport.

Wheat.

1. Josh Weatherhoft, Rockport.
2. Earnest Stateiler, Rockport.

Oats.

No entries.

Soybeans.

1. J. A. McCarty, Ft. Branch.

Winners of the show in the Hominy Corn Class:

White Hominy.

1. Scott Doup, Columbus.
2. Earnest Stateiler, Rockport.
3. Josh Weatherhoft, Rockport.

Flint Hominy.

1. A. F. Troyer, Lafontaine.
2. C. E. Troyer, Lafontaine.

Single Ear Hominy.

1. Scott Doup, Columbus.

Limited space prohibits listing of other winners, but a complete list will appear in the annual report of the Corn Growers' Association.

"In the production of dairy products man labor makes up from 20 to 30 per cent of the expense of production."—Hoard's Dairyman.

The agricultural colleges today in their Animal Husbandry Departments set the pace for the Live Stock Producers and Feeders.

Alexander, Conover & Martin

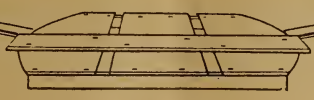
buy the feeding and experiment cattle for Indiana and Illinois Universities and we sell the fat and experiment cattle for Illinois, Indiana, Missouri and Ohio Universities.

These great State Universities have experimented and proved for you that the salesmanship and service of Alexander, Conover & Martin, is a fitting crown to your efforts to make the most money out of your Live Stock.

Consider well this important fact and let us handle your next shipment.

Alexander, Conover & Martin

CHICAGO **KANSAS CITY** **ST. LOUIS**



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is the ideal shipping package *BECAUSE:*

it can be used for all fruits and vegetables

it carries well and permits good ventilation

it is easy to pack, to handle, to inspect

it costs but little and can be obtained in any quantity

Write for prices TODAY

Package Sales Corporation

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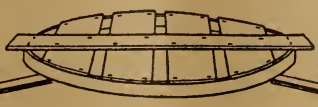


THE PURDUE APPLE SHOW.

Every year for six years the horticultural students of Purdue University have put on an Apple Show so that now it has become one of the important factors in their training. The show is managed entirely by students who thus gain experience in such affairs and put before the public a valuable educational exhibit.

The quality of the fruit shown at the Purdue Apple Show this winter, January 10 to 15, was on the whole superior to that shown at shows in former years while the number of entries was also much greater. Entries were received from commercial growers and high school students from many different counties. This, together with the fact that people from all over the state, attending the Farmers' Week program, had an opportunity to visit the show made it this year more than ever of statewide importance.

Fruit was exhibited from sixteen experiment stations in as many different states, giving a splendid opportunity for the study of the varietal characteristics of apples as grown under different conditions.

The prfizes awarded included six silver loving cups besides cash prizes and many articles of value to the fruit grower. Coffing Bros. of Silverwood, repeated their performance at the State Apple Show this winter by carrying off sweepstakes in the Commercial Growers' Class. Ercell Oberlin, of Hamilton, won the silver cup in the High School Students' Class. The highest scoring plate of apples in the show was one of Stayman's, scoring 98¼, shown by W. S. Oberlin, Purdue, '21, who won sweepstakes in his class and also the trophies awarded in the judging and identification contests. C. A. Garner, '21, won the silver cup for being the best vegetable judge in a contest open to all students.

W. H. BAKER IS CORN KING.

W. H. Baker, of Greene county, wins the title of corn king of Indiana for the second time in the 5-acre corn growing contest. He raised an average of 128.8 bushels an acre as compared to 121 bushels for 1919. Mr. R. S. Thomas, of the Soils and Crops Department of Purdue, had charge of the contest. Mr. J. A. Warren, of Porter county, and Mr. G. M. Quick, of Union county, were second and third with averages of 127.2 and 117.1 bushels per acre respectively. Mr. Baker was a member of the House of Representatives of the Indiana Legislature in 1919-1920.

PURDUE UNION PROGRESS.

The list of subscriptions to the Purdue Memorial Union Building now totals $750,000. This is a great showing, but $250,000 more is needed and $500,000 more desired. This is no fairy story we are relating, this is no air castle we are building, and this Union Committee is no bunch of idle dreamers. It is a live organization of live men from a live student body and given good live support from them. Alumni in order to be placed in this live class, you have to live up to the qualifications. Subscribe NOW.

Attention Mr. Stock Shipper

THE TERRE HAUTE, INDIANAPOLIS & EASTERN TRACTION CO.

have opened up their new stock pens located at all stations and other convenient points on the Northwestern Division between LaFayette and Indianapolis; also between Crawfordsville and Indianapolis. Your attention is called to a few of the special features of shipping your live stock via Electric Railway:

Shipments delivered in pens in Indianapolis in from two to three hours after loading;

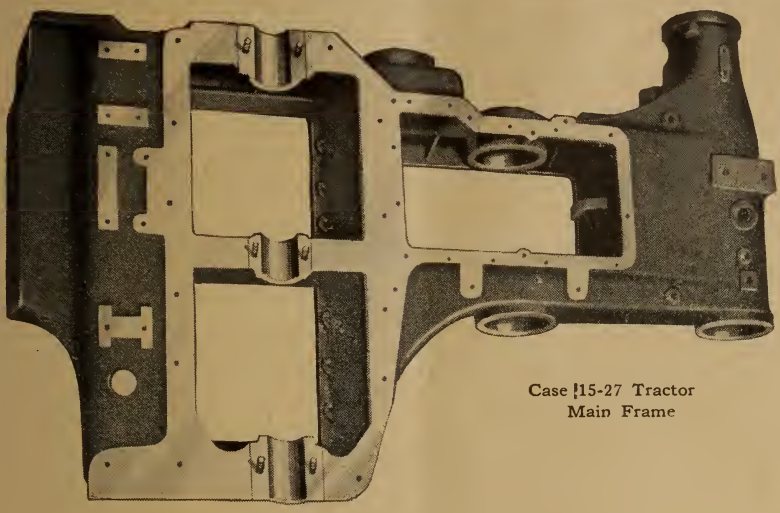
Private tracks into Indianapolis yards;

Shipments handled any hour day or night;

All shipments way-billed by crews in charge of cars.

A trial shipment will convince you of our superior service.

Address Traffic Dept., 208 Terminal Bldg., for further information.



Case 15-27 Tractor
Main Frame

The Importance of a Good Frame

The main frame is the foundation of a tractor. On it are mounted the engine, bearings, shafts, axles and their attachments. It is absolutely necessary, therefore, that the frame be designed and built with the outstanding fact in mind that upon it, basically, depends the continuous satisfactory operation of the tractor.

The main frame of Case 10-18 and 15-27 Kerosene Tractors is cast in one piece and is absolutely rigid and twist-proof. Three-point suspension permits all four wheels of the tractor to follow irregularities in the ground when working in rough fields, without subjecting the frame to twisting strains.

Our frame houses the rear axle, and bull pinion shaft, constitutes the main part of the crank case and transmission case, and contains the bearings for all these parts. Because of this composite housing feature, permanent alignment of shafts, gears and bearings is assured. This feature also provides easy accessibility to the principal working parts. Our main frame construction prevents deflection. This is one reason why Case Tractors last longer.

Next to the engine, the main frame should be the most important consideration in selecting a tractor.

J. I. CASE THRESHING MACHINE COMPANY

Dept. B310 RACINE WISCONSIN

CASE ON TOP SINCE 1842

CASE

TRADE MARKS REG. U.S. PAT. OFF. AND IN FOREIGN COUNTRIES

KEROSENE TRACTORS

This is No. 2 of a series of brief treatises covering correct tractor design and construction. Keep a complete file for future reference. Students interested in tractor engineering are invited to visit the Case factories at Racine and learn the details of tractor construction at first hand.

WHICH WAY IS YOUR STOCK GOING?

Down With the Scrub—Up With the Pure-Breds.

SHADELAND HEREFORDS

—HERD BULLS—
Woodford 8th, Woodford 71st, Disturber Magnet.
Herefords for Uniformity and Utility.
SHADELAND STOCK COMPANY,
LaFayette, Indiana.

ANGUS-CATTLE

We breed and produce the kind of animals that sire champions and sell for the top-most prices. If you are in the market for anything, or going to be, it will be to your interest to see or write me. 37 years of successful business. No other breeder can boast of such a record.

M. A. JUDY, West Lebanon, Ind.

BIG-TYPE POLAND HOGS

PICKETT AGAIN and MOLLIE'S CLANSMAN head our herd.

Our sows are the best. Several by Disher's Giant, Evolution, Big Bob Orphan and others. For sale at private treaty only. TRIED SOWS, GILTS bred or open.

BIG TYPE POLAND FARM,
Loogootee Indiana.

A O D L

Feeding molasses pays. You-Needa brand is a first-run grade. Buy direct from mills. mills.

Central Feeding Molasses Company
Warsaw, Ind.

(Continued from page 199)

South America has some of the finest and some of the poorest, both in land and weather.

Down around Buenos Aires, the richest part of Argentina's pampas, where the finest silt was deposited as the inland sea dwindled, is ont of the most marvelous agricultural regions in the world. Flat as a pie plate, so level that one can see the neighbors for miles, not a hillock or a swell to mar the view, not a stone to throw at a hen, but great fenced ranges of cattle and horses with the harmless ostrich of the country feeding among them. Alfalfa seeds itself—the Italian farmer (tenant) saves money on his contract to leave the land in this crop by scattering a pound or two to an acre and letting the first plants go to seed and cover the rest. Cattle and horses turned loose by the Spaniards soon multiplied in great wild herds; both first killed for hides and tallow, then the cattle for dried beef, and now the latter are bred up for prime frozen beef and shipped to Europe.

Then we have other regions of the continent which represent every type of soil and weather. But we are not interested so much in them as of the humid region.

How do you picture the American farmer?

To the writer several types arise. One is the quarter section general farmer of the corn belt, with his big barns and big draft horses, his gang plows and cultivators, his corn and clover, cattle and hogs spinning into town on Saturday afternoons in his auto. Another is the dairy farmer, with his model barn and milking machinery. Another the breeder, and like specialists, such as the citrus grower, apple grower, potato grower, and trucker.

Let your picture of the American farmer be what it may, you will hardly find his counterpart in South America. There are many splendid ranches and plantations and great land owners with modern methods adopted after personal visits to the United States and Europe. But even they cannot go to town Saturday afternoons in their autos, because there is probably no road, or it is passable only to a great Argentine cart with ten foot wheels drawn by a dozen little horses.

Between the great land owner and the peasant field hand there is no middle class as our farmers.

One quickly misses at least two products of our own farming middle class. One is the wide diversity of food specialties—these countries suffer for lack of clean milk. butter, domestic cheese, fresh and dried fruits, all-year-round fresh vegetables and many other products which have become commonplace with us. And the other is public opinion. When we find foot and mouth disease accepted as inevitable and see the beginnings of an experiment plant ruthlessly scrapped after a change of government we realize the value of our American farmer in terms of public opinion.

(Continued on page 236)

INTERNATIONAL
The Easy-Pull Spreader

The outstanding feature of the International Manure Spreader, among a number of exceptional features, is its light draft.

Equipped with roller bearings at seven points, it runs with almost the smoothness of a sewing machine.

Two rapidly revolving steel beaters tearing tough chunks of manure into bits; a heavy load carried on the main axle, to be moved steadily back to the beaters—these things ordinarily would tend to create heavy draft. But roller bearings in the new International Spreader smooth out the hard work and convert what otherwise would be "heavy draft" into a horse-saving, spreader-saving "Easy-Pull."

The nearby International dealer will be glad to tell any inquirer more about the International spreader.

INTERNATIONAL HARVESTER COMPANY
OF AMERICA INC.
CHICAGO U S A
92 Branch Houses and 15,000 Dealers in the United States.

HANSEN'S

Dairy Preparations

For cheese and butter making on the farm as well as in largest creameries and cheese factories, Hansen's preparations are standard. They are **pure, concentrated, and simple to use.**

Use **Hansen's Rennet Tablets,** Rennet Extract or Lactic **Ferment Culture** for cheese making (in the small dairy **Junket Brand Buttermilk Tablets** are used to advantage for cheese making).

Hansen's Danish Butter Color, and **Hansen's Cheese Color** are used in the finest creameries and cheese factories. Hansen's products are on sale at drug or dairy supply stores or sent direct.

"The Story of Cheese Making," by J. B. Frederiksen, free on request.

Chr. Hansen's Laboratory, Inc.
Little Falls, N. Y.

LaFayette Printing Co.

CATALOG PRINTERS

LAFAYETTE, INDIANA

Our No-Freeze Stock Fountain
is a **wonder.**
It keeps the **water warm** in winter, **cool** in summer.
Can move your water supply to any part of the farm.
Write for catalogue **today.**

J. Q. CLARKE TANK CO.
N. Walnut St., Crawfordsville, Ind.

(Continued from page 219)

men had for sale. Many localities are standardizing on a certain variety so that this coming year they might have a cleaner quantity of wheat for sale. This is particularly true where the certified wheat was hot water treated to eliminate the loose smut. The millers and grain dealers have backed the movement exceptionally well because it standardizes the quality of grain that they have to handle, thus insuring a better price for them, and consequently for the farmer. It will be a medium through which pedigreed varieties can be put out from the Experiment Station and kept track of, and disseminated through the state. This year two pedigreed varieties are thus being disseminated. The inspection work is necessary to keep the varieties pure, due to almost certain mixture through the threshing machine, and which will necessitate some roguing of varieties as well as of rye which many men had to do this last year.

Our certified soybeans are in demand from several states in the corn-belt, and we hope that as the years progress Indiana can be as well noted as a purebred seed center as she is for corn and cattle. Every man interested in the improvement of not only his own crop as to bushels and quality, but those that may be interested in going into the seed business should get in touch with the certification work and be one of the men furthering this movement in Indiana.

Winter is a season for planning, and it is just as easy to make plans for proper orchard management as poor management. Then back those good plans up by sending in an order for the insecticides and fungicides necessary to carry out an approved spray schedule during the summer. And then carry it out. Fruit will not "just grow" in Indiana; it must be taken care of as carefully as any other farm crop, and spraying is one of the most important operations.

Jolly Letty, a Jersey senior four-year-old, recently made a second register of merit, and this record of production is a 41 per cent increase over her former record. With this she has proved to her owner, Mr. J. A. Driscol, of Liberty, Indiana, that she is a high producing animal.

Check Up On Feeding Results

Then Get International Prices

A poor feed is expensive at any price. The price difference between a balanced feed ration and an unbalanced one comes out of your milk pail. If your home grown grains are not balanced properly you are losing money by neglecting to feed the needed concentrates.

FEED

INTERNATIONAL

SPECIAL DAIRY FEED

Low Price — High Production

The quality of International Special Dairy is well known. Dairymen everywhere get higher milk production from this feed than from any other feed of similar analysis. This result is *guaranteed.* Use Special Dairy as an entire ration, or to balance your grains.

International Special Dairy Feed has taken a bigger drop in price than your dairy products have. It is priced so you still maintain your war-time margin of profit. Write us direct for information if you have no International dealer near you.

Live Agents Wanted. A live agent can quickly sell several cars of feed in each vicinity at this new, low price. Write for details.

INTERNATIONAL SUGAR FEED CO.
MINNEAPOLIS, MINN., Mills at Minneapolis and Memphis

Boost Your State and Help Purdue

E. RAUH & SONS FERTILIZER CO.

Union Stock Yards
INDIANAPOLIS, INDIANA

Manufacturers of

HIGH GRADE MIXED FERTILIZERS
ACID PHOSPHATE
Digester Tankage for Hogs
Meat Scraps for Poultry

Importers of

Nitrate of Soda **Sulphate of Ammonia**
Potash Salts all Grades

AGENTS WANTED IN UNOCCUPIED TERRITORY.
We Solicit Your Patronage.

MERIT

Judged on the merits of its contribution to human welfare the Dairy Industry ranks first in point of service to mankind.

This service stands or falls upon ability to produce milk foods with their nutritive qualities and delicious flavors unimpaired.

In like manner the distinctive, sanitary cleanliness which the use of

Wyandotte Dairyman's Cleaner and Cleanser

provides, constitutes a service which has contributed largely to the high standard of quality maintained in the field of Dairy Production.

During the year before us you can place your orders for this great cleaner in full confidence that the quality which has given character to this product will be steadfastly sustained.

It cleans clean.

Indian in circle in every package

THE J. B. FORD CO.,
Sole Mnfrs., Wyandotte, Mich.

(Continued from page 206)

Zionsville, president; F. F. Johnson, of Russiaville, vice-president; and R. L. George, of Lebanon, secretary-treasurer.

C. C. Richards, of Oaklandon, was elected president of the Ayrshire Breeders' Association; O. E. Reed, of Martinsville, vice-president; and L. W. Hart, of Valparaiso, secretary-treasurer.

Much interest was manifested in the announcements of winners in the various boys' and girls' club contests conducted throughout the state during the past year. Homer Crandall, age 16, of Mt. Summit, is the new juvenile corn king, having grown 142.27 bushels of high quality corn on one acre and at a low cost of production. The New Albany Potato Club won the potato championship of the state and received a $50 cash prize. Adelle Davis, a 16 year old club girl from Lizton in Hendricks county, won both the baking and the home making club contests, the first time in the history of the state that one girl has won both prizes the same year.

Mrs. Chas. W. Sewell, who spoke Tuesday evening before the general meeting, told of the things women must have and do before they can hope to "keep up with father and the boys." But if the number of women who attend the Short Course each year, and if the live Home Economics Association which they maintain are reliable indications, it would seem that father and the boys will soon find it necessary to set a new pace. For president the Home Economics Association elected Mrs. Morton Fordice, of Russellville; for vice-president, Miss Pansy Norton, of Danville; and for secretary-treasurer, Miss Florence M. Boston, of the Home Economics Extension Department of Purdue.

The week was a strenuous one, crowded with lectures, demonstrations and discussions. The material presented this year was practically all new and elicited the keenest interest. Thursday was the big day with respect to attendance, and by Friday evening the last sojourning farmer had turned his steps homeward, realizing more fully than ever that despite temporary periods of low prices and dwindling profits, farming is a pretty good sort of job after all.

Keep on the lookout for lice—they are an enemy of good stock.

"MADE IN INDIANA"

Kingan's Digester Tankage

(HOG FOOD)

Manufactured in accordance with the Indiana Feeding Stuffs Control Law—Guaranteed to contain not less than 60% Protein, 6% Fat. Is recognized as one of the leading brands on the market and a very profitable article when fed at any season throughout the year. A trial will convince you of its merits.

Insist on obtaining "KINGAN'S" Digester Tankage of your dealer.

KINGAN & CO. LTD.

BEEF AND PORK PACKERS,
INDIANAPOLIS, IND.

Satisfactory Sanitary Sewage Disposal

The old time cesspool is rapidly giving way to the modern sewage disposal tank. These tanks not only dispose of sewage in a much more satisfactory manner but their original cost compares favorably with that of the ordinary cesspool dug under present conditions and their maintenance is considerably less than that of the cesspool.

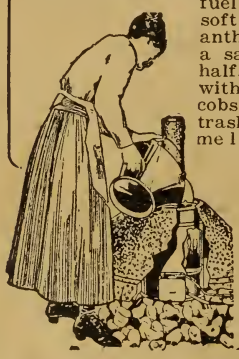
Sanatar Portable Sewage Disposal Tank

The tank illustrated is manufactured by the Sanatar Co., 301 Indiana Trust Bldg., Indianapolis, Ind. It is known as the Sanatar Portable Sewage Disposal Tank, made of individual reinforced concrete slabs fitted together with ingenious interlocking joints, water proofed to eliminate leakage or absorption. An installation for an average home, with a family of eight, is made up on sixteen of these pre-cast slabs weighing less than 75 lbs. apiece. It can be set up by a man and helper in about one hour.

The tanks are regularly made in seven sizes of capacities to take care of the sewage from eight to 140 people. The manufacturers have a corps of engineers who will gladly assist any contractor with scientific or engineering data in solving his particular problem and in advising about the final disposal of the effluence after leaving the tank.

BOWERS BROODER STOVES

Don't let hard coal shortage rob you of the benefits of a Brooder stove. Get a Bowers **Air-tight, All-fuel** Brooder stove and burn any kind of fuel you like. Burns soft coal as well as anthracite, and at a saving of nearly half. Works fine with stove wood, cobs, chips, chunks, trash. The soft, mellow, constant heat saves your chicks and makes them grow.



F. M. Bowers & Sons Co.
1101 West Wash. St., Indianapolis, Indiana

(Continued from page 230)

As markets for our farm products these countries offer definite possibilities, but chiefly in specialties. We cannot sell frozen beef in Argentina, but we are selling bulls and boars and dried fruit and canned goods. The Brazilian market for our flour is shrinking as Brazil increases in wheat crop, sets up mills and buys Argentina flour, but we can sell canned buttermilk and cheese there.

In Argentina the writer made the acquaintance of a young American who started with nothing less than ten years ago, and is getting rich by raising for market something that the Argentinos would not grow themselves. A strange, obscure hothouse delicacy? No; nothing stranger than the hog. He saw its possibilities as a specialty and there are other specialties overlooked by the big land owners. The opportunities are there as soon as markets are provided. Brazil had never shipped a ton of frozen beef before the war, but now it has great American packing plants and the cattlemen are opening up new range country.

THE STATE MUTUAL HOG INSURANCE CO.

SPRINGFIELD, ILLINOIS.

Incorporated in Illinois. Licensed in Illinois, Indiana, Ohio and Missouri.

"THE BOOSTER COMPANY"

WE INSURE

Herd Boars, Brood Sows and all kinds of Registered Hogs. We insure your sale and furnish a fieldman to attend your sale without extra charge for his service, to boost and give every assistance possible to make it a big success.

WE INSURE

Commercial hogs of any age, class or weight. Our policy covers DEATH FROM ANY CAUSE and entitles you to free veterinary service at all times during the period of the policy. Our premium income for 1920 showed an increase of THREE HUNDRED PER CENT over 1919, which proves the value of this class of insurance.

THE COMPANY

The State Mutual is a company organized to write Hog Insurance exclusively and is not interested in other lines of insurance. Our phenomenal success is due to service given our policyholders and the prompt payment of losses. Hog raisers and breeders should communicate with us before placing insurance. We can give you added service and save you money.

STATE MUTUAL HOG INSURANCE CO.

C. S. Boynton, Pres. SPRINGFIELD, ILLINOIS. A. C. Littlejohn, Secy.

SEE THE
Hoosier Grain Separator
IN OPERATION

BY VISITING OUR FACTORY AT FORTVILLE, INDIANA, ANY TIME

We guarantee to separate 100% so that each and every seed that you sow will sprout, grow, develop and produce. It will make a perfect separation of oats from wheat, rye from wheat, barley from wheat, wild from tame oats, pin oats or small oats from screenings, chess from wheat, cockle or wild pea from wheat, oats from speltz, oats from barley screenings, wheat from flax, cleans and grades peas and beans, grade corn for seed, all species of clover seed (and take out 98% buckhorn), timothy, garden seeds, rice, alfalfa seed, millet, etc. When the Hoosier separates, no testing for seeding and planting is necessary.

Why plant, cultivate, reap and thresh, year in and year out, seeds that are not productive? You should know that a large percentage of every crop that is grown is either too weak to sprout, or does not have sufficient vitality to produce, and even devoid of a germ. This costs you larger sums of money and labor.

The Hoosier will increase your income. This is the first and only machine that has or is being manufactured that accomplishes the results we claim.

Bring your mixture from your own farm and satisfy yourself. You need the Hoosier. It is guaranteed or money refunded.

The United Cereal and Grain Separator Co.

FORTVILLE, INDIANA.

A Wonderful New Product Takes the Place of the Smoke House on the Farms

Instead of smoking your hams, sausages and meats, paint them with a smoke in liquid form. Gives meat a delicious flavor, that can not be obtained in any other manner; makes it wholesome and exceedingly appetizing.

"Old Gibraltar Concentrated Smoke"

Two coats of Concentrated Smoke, ten days apart, is generally sufficient. Your meats cured in this manner will be even more delicious than if the Old Smoke House was used. You can save yourself a world of time, and make your meats ready to market, ready to use, with scarcely an effort. **"Old Gibraltar Concentrated Smoke"** is put up in **Quart Bottles—75 cents—Brush for applying Free.** Your nearest druggist can supply you, or write

KIEFER-STEWART CO.
Est. 1840 Indianapolis, Ind.

FOREMOST AMONG BETTER GRINDERS

Crush and grind all the grains that grow. Fine for hogs or moderately coarse for cattle feeding.

Strength, durability and service radiate from every line of these powerful mills. Simple but effective in adjustment. A strictly high grade piece of machinery for the farmer or miller.

Light Running—Long Life—Extra Capacity Cone-Shaped Grinders

It pays well to investigate.
10 sizes: 2 to 25 H. P. or more.
Write today for FREE catalog.

THE C. P. BOWSHER CO.,
South Bend, Ind.

PLANS FOR THE 1921 HATCHING

(Continued from page 220)

eggs from these flocks was a very reliable indication of the results to be expected from each hen through that season. Selection is surely worth while and trapnesting the stock for the first hatch may be worth while. The number of eggs a hen lays in any year or during the three months previous to the hatching season has little influence on the fertility or hatchability of the eggs laid.

Management of Stock: The best hens and males can not give good results unless they are housed, fed, and managed properly. Make the house comfortable to the hen by having it well ventilated, well lighted, dry, and clean. Feed any good poultry ration, such as the Purdue ration, and make the birds work for their feed. Give your birds an outdoor range. If any birds have to be kept housed, let it be your stock not used for breeding. Results from many experiment stations show conclusively that closely confined birds give much lower fertility and hatchability in their eggs than birds on range.

Selection of Eggs: The selection of eggs is important from the standpoint of what you get for them on the market. Hens tend to lay eggs of the same size, shape, color, and shell texture as the one they were hatched from. It is well to select the good sized, uniform colored, well shaped, and good textured eggs because these are the eggs that bring the highest price on the market. The shell texture may have some influence on the results of the hatch.

Second—the Operator: On the operator depends the results of any hatch. Rules for operating an incubator and handling the eggs previous to setting and during the hatch are easily obtained and followed, but it is the skill and good judgment of the operator in nicely adjusting these rules to meet the conditions under which he or she is operating machines that determines the final success or failure of the hatch. The most important factors under the operator's control are:

1. The eggs should not be held over ten days before setting.

2. The temperature of the room for holding the eggs should be between 50 and 60 degrees.

3. The eggs should be turned once each

Skilful Feeding

is the secret of maximum milk yield

Feeding cows a generous balanced ration of palatable feed containing the right proportions of protein, carbohydrates and fat will insure a full yield of rich milk. The difference between profit and loss in dairying is mainly a matter of **feed.**

ACME Dairy Feed

is a balanced ration. The experience of many years goes into its making. Every ounce of it is pure and wholesome. It contains no cheap fillers and no waste.

Acme Dairy Feed produces results. It is palatable—the cows like it—and it contains the exact proportions of health-giving milk producing elements necessary to secure a maximum yield of milk.

Acme Dairy Feed is used by thousands of the leading dairymen of the country and has stood the test of many years.

Ask your dealer for ACME Feeds

Make every cow a 100% producer by using the palatable balanced ration—Acme Dairy Feed.

There is an Acme Feed for every animal.

ACME Hog Feed
ACME Scratch Feed
ACME Stock Feed
ACME Horse and Mule Feed
ACME Farm Feed
ACME Barleycorn Feed
Alfalfa Molasses Grain Feed for Horses

ACME-EVANS CO.

INDIANA'S LARGEST MILLERS

INDIANAPOLIS - - INDIANA

day while being held previous to hatching.

4. The temperature during incubation should be between 101 and 103 degrees with a standing thermometer not touching the eggs. A uniform temperature of 101 or 102 degrees throughout the hatch will give as good results as a varying temperature. A temperature higher than 103 degrees is more serious than 100 or below. The range of temperature is one of the most important causes of good or poor results.

5. The eggs should be turned at least twice each day after the second day of incubation. Turning them three times each day will give slightly better results.

6. Moisture, ventilation, and cooling may vary widely with little effect on the results.

We will eliminate the larger part of that fifty per cent which is causing us so much worry in direct proportion to how rigidly we select our breeding stock and hatching eggs; how well we house, feed, and care for the stock; and how wisely we adopt good methods of operating and handling stock eggs and machines to our individual farm conditions.

A LICENSED "DRIVER."

Biggs—"Our carpenter can drive nails like lightning."

Jiggs—"How's that?"

Biggs—"Well, you know lightning seldom strikes twice in the same place."—Science and Invention.

"Henderson's Dairy Gem," an Ayrshire owned by the Gossard Breeding Estate of Martinsville, is the champion cow of Indiana, this honor having been conferred upon the animal Jan. 14, 1921, at the farmers' short course at Purdue University when production figures were compiled and it was found she had produced 20,042 pounds of milk during the season of 1920, the milk containing 804 pounds of butterfat.

The Gossard herd was also awarded the state dairy Association's gold medal for having six cows each producing more than 500 pounds of butterfat during the season. The herd is managed by Purdue men.

The price charged for cow's milk nowadays is enough to get your goat.—Topics of the Day.

ORDER FROM

Mid-West Crushed Stone Quarries Co.

AGRICULTURAL LIMESTONE

SOIL SWEETENER ACID REMOVER

THE FARMER'S BEST FRIEND

Our Price is Right
Our Product is Right

Our Shipments are Right
Box and Open Top Cars

—QUARRIES—
Greencastle, Indiana. Ridgeville, Indiana.
General Office—Indianapolis, Ind.
A. B. MEYER, President.

Have YOU

Renewed your subscription to

THE PURDUE AGRICULTURIST

DO IT TODAY

One Dollar will bring it to you by mail for one year.

Fill out the attached coupon and send it in NOW.

- -

PURDUE AGRICULTURIST,
West LaFayette, Ind.

Please find enclosed $.....for which you will send me the PURDUE AGRICULTURIST for.....years.

Name.....

Address.....

INDIANA LEGISLATURE VISITS PURUE.

Members of the Indiana Legislature were the guests of the Rotary Club of Lafayette on a tour of inspection of Purdue University Thursday, January 13.

The lawmakers of the state were brought from Indianapolis to Purdue by means of special cars and upon their arrival were given an ovation by the Rotary Club of this city and by the entire student body. The gubernatorial salute of 17 guns was fired by a unit of the University cadet corps and a speech of welcome given the legislators by Pres. W. E. Stone, followed by a talk by the spokesman of the senate, Hon. Estes Duncan, and by yells by the student body. An entire University parade was then formed, led by the Purdue Band and followed by the cadet corps, faculty, coeds, juniors and seniors.

The guests were then entertained at a luncheon given in their honor at Agricultural Hall by the Senior Science girls. Pres. W. E. Stone and Prof. G. I. Christie, director of the experiment station, thanked the state solons for their consideration in making the inspection trip and explained the need of more funds with which to carry on the immense amount of work undertaken by the University.

In the afternoon a trip of inspection was made through the various buildings, shops, and laboratories on the campus and the tour ended at the Stock Judging Pavilion where Dean Skinner explained the extent and amount of work carried on by the School of Agriculture and the great need for more funds. L. B. Clore, director of the Federal Farm Loan Bank, of Louisville, who has been a Purdue appropriation booster in former years, emphasized that "The superiority of instruction and spirit at Purdue is not to be doubted and we can not afford to hamper the growth and extension of this good work by refusing Purdue the money it needs and deserves."

The visitors were then conducted to the Soldiers' Home in automobiles and returned to Lafayette where they were entertained in groups at the various fraternity houses. The return trip to the Capitol City was made in special cars leaving Lafayette at 7:30.

FIGHT THE CHINCH BUG.

In 1917 no reports of the chinch bug reached the Experiment Station, but in 1919 twice as many were received as in 1918, and in 1920 twice as many as in 1919. Apparently the bugs have not reached the peak of their abundance, and as they are now wintering in large numbers, a heavy infestation of wheat, rye, and oats next spring, by the first brood, and of corn by the second brood is probable unless severe winter conditions kill them, or unfavorable conditions next summer prevent their development.

The preferable hibernating spots for the bugs are ditch banks, the edges of wood lots or brushy areas, hedges, brushy fence rows, and in neglected pastures, grown up to wild shrubs or bunch grass. Obviously at the present season there is only one measure applicable for their destruction, and that is through BURNING. Careful work destroys 75 per cent of the insects, and the importance of burning at this time of the year is illustrated by the fact that one female bug killed now means 150 less in the wheat and more than 10,000 less in the corn this coming summer—enough bugs to destroy more than 5 hills of corn. Co-operation of the entire community to utilize every means against the chinch bug will simplify and make possible its control and prevent enormous losses. A rotation may be used which will starve the bugs, but again the entire community must cooperate to make this a success.

It is not necessary to burn corn stalks, but since the bugs will hibernate in corn shocks and beneath the sheaths at the base of the corn stubble, especially if the field was infested the previous season it is important to remove the shocks as early as possible to thoroughly and deeply plough under infested stubble at least before the bugs take flight in the spring.

"PRE-MATRIMONIAL" ASTRONOMY.

It was a beautiful moonlight night and they were taking a stroll down the beach.

She—"Does the moon affect the tide?"

He—"No, dearest, only the un-tied."—Science and Invention.

Are you using the cooperative marketing system in your disposal of dairy products?

Indianapolis Cordage Co.

Indianapolis, Indiana

Manufacturers of

HIGH GRADE BINDER TWINE

Our product guaranteed in all respects the same as other High Grade Twine.

Treated to Withstand Insects

Indianapolis Cordage Co.

Indianapolis, Indiana

Office and Mill

1959 South Meridian St.

COLLEGE FOOTWEAR
OF ALL DESCRIPTIONS
FOR ALL OCCASIONS
—FOR—
CO-EDS, STUDENTS AND FACULTY
The Varsity Boot Shop
302 State St., West LaFayette

Have Her Picture Framed
at
The Foster Shop
Opposite the Campus

SOUTHWORTH & TOBIAS CO.
STUDENTS NOTICE!
Headquarters for
Hart Schaffner & Marx Suits
and Overcoats
High Grade Furnishings

When you think of
ATHLETIC GOODS
think of
DEAC

ANYTHING A STUDENT NEEDS
GABLER'S BOOK STORE
STRAND THEATRE BUILDING

We Are Never Too Busy
to do YOUR
SHOE REPAIRING
Come in! We'll give you—
A QUALITY JOB
BOSSUNG
in rear of Varsity Shoe Store

Do You Advertise in
The Purdue Agriculturist

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MAR 8 1921

The PURDUE AGRICULTURIST

MARCH, 1921

Vol. 15 No. 6

Purina Chows Will Save Them

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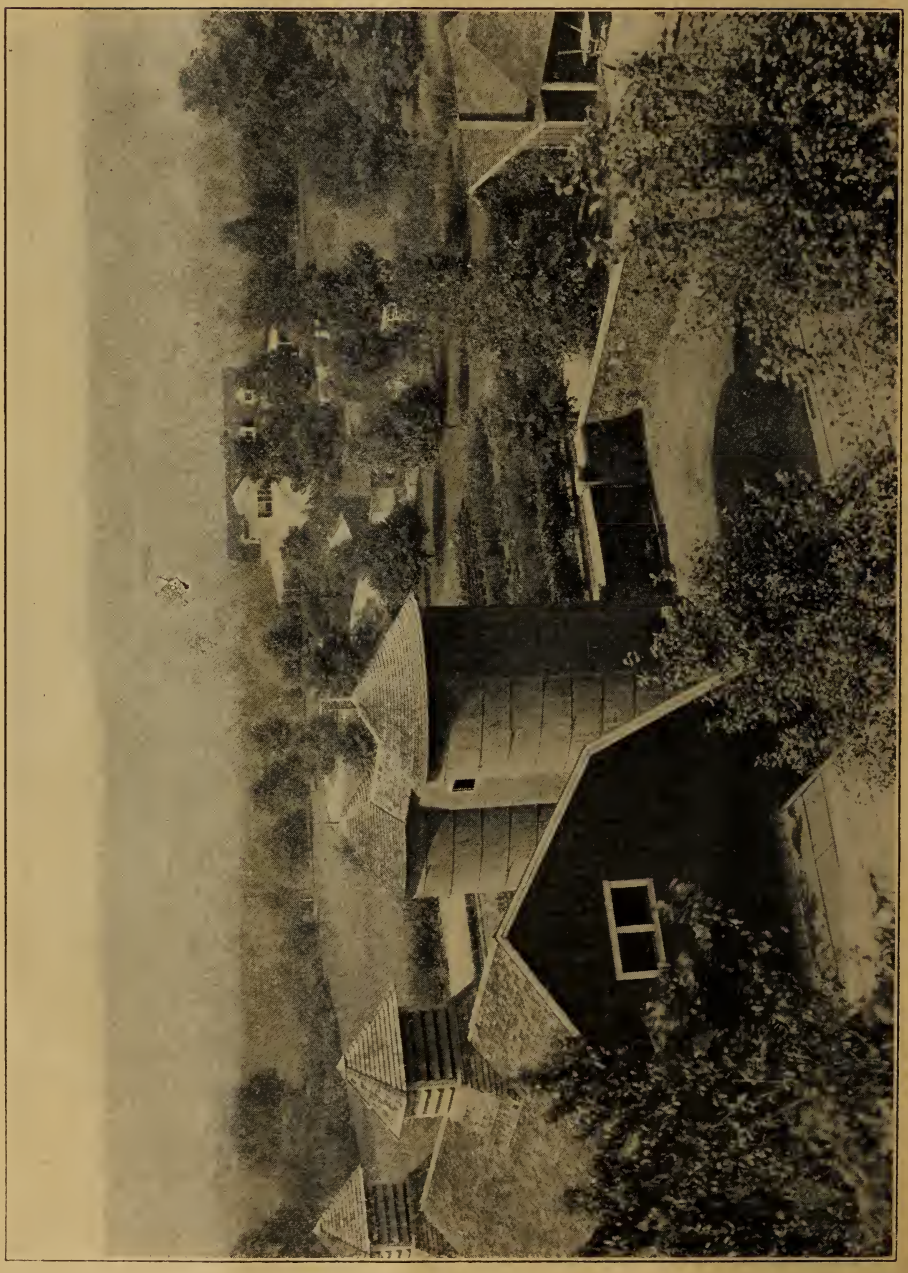
Entered as second class mail matter December 4, 1906, at the Post Office, LaFayette, Ind., under the Act of Congress of March 3, 1879.
Subscription Price One Dollar Per Year. **Advertising rates sent on application.**



A modern farmstead among the hills.

The Purdue Agriculturist

VOLUME XIV MARCH, 1921 NUMBER 6

The Shepherds of Indiana

By Claude H. Harper,
Sheep Specialist for Purdue Experiment Station.

INDIANA occupies a prominent place in the sheep world of America. On the basis of numbers of sheep per acre Indiana stands in the top six states of the United States. She produces three and one-half millions of pounds of wool annually and normally markets two thousand decks of sheep and lambs.

She has had the honor of claiming the grand champion wether at the International for the past five years. The breeders of Hoosierdom win regularly at our best state fair sheep shows outside of Indiana, including, Ohio, Missouri and Illinois. Today Ohio State fair has America's foremost breeding sheep show, and if ranked in quality and quantity, Indiana State fair sheep show would stand second in all mutton breeds. At the last International our feeders won two of the four first prizes in carload lots exhibited.

Indiana ranks among the first six states in number of sheep per acre. The two great problems in sheep industry in Indiana are, first, marketing the wool clip; and second, handling and marketing lambs. Solution of these will insure a remunerative and economically sound sheep business.

NEXT MONTH—Two big articles by: Ellis McFarland, Secretary of the Percheron Society, and C. E. Troyer, a Champion Hoosier Corn Grower.

Indiana's sheep business, like that of every other farm state, is logically grouped into three divisions. First of all we have the purebred breeders, whose business is very closely interwoven with the second group; those that produce market lambs and wool. Economically the purebred breeder depends upon the farmer with grade ewes to buy the bulk of his surplus stock. The last division is the feeder, whose business is in no way connected with the other two branches of sheep husbandry just mentioned. His duties are simply methods of fattening. Since feeders buy only western sheep and lambs for fattening purposes the sheep feeding business could enlarge or diminish without any material effect upon either the purebred business or the production of lambs and wool on our farms.

In round numbers there are 240 purebred sheep breeders in Indiana, and 140 of these breed Shropshires. This may not include every owner of purebred sheep in Indiana because a number of farmers own purebred sheep not eligible to registry because the ancestry cannot be traced to definite individuals. In other words, we can find a rather large group of farmers who have been in the purebred business some time but failed to keep up the "papers" on the flock. Others not included in the above list own only purebred rams.

Since there are 140 Shropshire breeders out of a total of 240 breeders of all breeds, we can logically say Indiana is a Shropshire state. The farmer's sheep famed for its mutton and wool production, its adaptability to general conditions, makes one feel the breed next in line in popularity would be a sheep of somewhat similar type. The Hampshire follows with twenty-six breeders, then comes the Oxford Down, Cotswold and Rambouillet in order named, followed by the Dorset Horn, and Merino. There are also a few flocks of Tunis, Southdowns, Cheviots, Lincolns and Romneys to be found. These breeds are not widespread throughout the state. The breeds making the most rapid growth, outside the Shropshires are the Oxfords, Hampshires and big smooth bodied Rambouillets.

The 1920 census shows 9,282 purebred sheep in the state. They rank as follows: Shropshires, 5,743; Hampshires, 720; Oxfords, 628; Cotswolds, 526; Rambouillets, 333; Dorset Horns, 250; Merinos, 185; Tunis, 157; Southdowns, 110; Cheviots, 88; all other breeds, 542.

The 1920 assessor's reports show Indiana has approximately a half million breeding sheep. This shows a rather substantial increase during the war. This increase has not come about where many folk would naturally expect it. We have been told that hilly land is adapted to sheep, and there ought to be lots of sheep on such land. That may be true, but the hills of Indiana have no more sheep today than they had four, five or even twenty years ago.

The rich corn belt lands have the honor and distinction of giving Indiana her increase in sheep during the past four years. On the best lands of the state, where swine are produced in abundance and roughage wasted lavishly, there is where the bovine stock multiplied. Perhaps patriotism and the desire to save that rough feed was the real reason for this increase. Now that sheep are on corn belt farms, that never kept sheep before, does not mean they are going to be abandoned. Our increase in sheep during the past few years has been largely by saving back ewe lambs. Farmers as a whole have little appreciation for the western ewe, probably because many have already had an experience they do not want to repeat. The wrong type of western ewe, the one that shears only four pounds of wool, or is toothless, has had her day. The right type of western ewe, the one that shears eight pounds of marketable wool and can raise a good lamb will continue to grow in favor, with some classes of farmers.

The two big problems before the producers of market lambs and wool in Indiana is the question of a method of marketing the wool clip and the value of docking and castrating market lambs. The first question is well on its road to a solution. The second question will be attacked so vigorously before long that it will cease to be a problem. Thus we will have insured a remunerative sheep business built upon economic and sound principles.

The following twelve counties rank first in sheep production in Indiana: LaGrange, Steuben, Noble, DeKalb, Allen, Kosciusko, Montgomery, Boone, Delaware, Jay, Grant and Sullivan.

The sheep feeder occupies the speculator's position. Upon good buying and selling depends his business. In the summer and fall he buys sheep and lambs to consume the surplus feed on the farm and sells them again when fat. If he buys and sells well the only other problem he is vitally interested in is economy and rate of gains.

The sheep feeding business of Indiana occupies the same counties as every other sheep enterprise. On productive land you find feeding sheep and on "lean" land no feeding sheep, or few sheep of any class. Our sheep feeding business occupies the same territory today as it did ten years ago. No change and with the same old problems bobbing up here and there.

Northeastern Indiana has the best class of feeders. They seem to know more about their business. They seem to understand their problems better. In fact many farmers in that end of the state have been feeding for the past thirty years. They were once on the dry lot proposition. Now they glean the farms first of all and finish up in a dry lot. When the sheep and lambs are finished in that section of the state they usually go to the Buffalo market. Big red barns and fertile fields characterize the farms of these feeders.

One hundred thousand sheep and lambs went into 4000 Indiana feed lots last fall. The normal consumption for Indiana is somewhat above this figure, but owing to uncertain market conditions last autumn many old feeders stayed out of the business.

The richer corn belt land in central Indiana offers more pasture and grazing opportunities than northeastern Indiana. Hence the problem of producing prime carcasses becomes a bigger one. The question of shelter also enters in here. Many feeders in this district, however, don't seem to realize sheep and lambs would be fat when they go back to market and, furthermore, many have not yet realized pasture alone will not make prime lambs.

The status of Indiana's sheep business could be made a much longer story, but enough facts have been stated to make the reader realize Hoosierdom has opportunities.

(Continued on page 288)

Selling Indiana Apples

Hoosier Apple Growers Have Ideal Market.

By Prof. Laurenz Greene,
Head of Department of Horticulture.

RECENT freight rate increases have led some men to think that the Hoosier apple grower is again quite lucky. Pacific Coast apples have long bothered him as they compete for the fancy trade and often for the cheaper trades as well. Increased freight rates are going to make it more difficult for the apple growers either in the east or extreme west to reach and compete with Indiana apples on the central western markets.

During the last three or four years all the apples that could be produced in this state have found a ready market near home, in fact in the orchards where they were grown. This was not true in all cases in 1920, owing to the large crop of peaches and the large crop of apples produced in farm orchards. The eastern grower with his large crop and high price packages also competed with the Indiana orchard men for the Indiana customer. Nevertheless, very few Indiana growers saw their apples rotting in the orchard for lack of labor, cars, packages and a market. Such conditions did occur in Michigan and New York.

Since 1915 most of the middle-western apple growers have enjoyed this orchard trade. Customers have bought liberally at the orchard, furnishing their own packages and making their own deliveries. Cash at the time of sale was another nice feature of this trade. Sales have amounted to several thousand bushels of apples in many cases and not a few growers have eliminated "packages," "commissions," "freight," "express" and "storage" from their bookkeeping. These sales have increased and succeeded in almost direct proportion to the amount and kind of advertising that has been used. This advertising varies with the locality and no method will succeed under all conditions.

Waiting for apples at Mr. Widney's orchard. Some men waited in line for hours for sale to open.

Perhaps the system most used was originated by Mr. H. M. Widney, St. Joe, Indiana, and adopted by a number of other orchardists in the last two or three years. This system consists of setting a sale date at which time all apples will be on sale and selling will continue until all are disposed of. No sales are made or orders booked before the sale date. It is necessary for the customer to be on hand when selling begins in order that he may be sure to get the kind of fruit he wants. The grower does not have to bother about filling orders or reserving fruit for a customer who does not happen to be on hand. If large numbers of customers are expected a large selling force is necessary. Over one hundred customers at

the orchard at one time frequently occurs. This necessitates prompt service in order to give satisfaction. Mr. Widney registers his customers as they arrive and turns them over to a salesman who records on the registration card what has been purchased. These cards are turned in to the cashier when the sale has been completed and are filed to make up a mailing list for next year's announcements of the sale catalog. If the sales date method of selling is used the fruit should all be picked and graded before the opening day. This means that only varieties which ripen approximately at one time are produced. An ample sales force must be provided to handle the customers promptly.

Another selling plan is used by some Indiana growers. Orders are booked at any time during the year; the customer is notified by the grower as to the time that his fruit will be ready for him. He is allowed a certain time in which to take the fruit from the orchard and if it is not called for at the expiration of that time the owner is at liberty to re-sell it. One grower books orders with the understanding that the price will be fixed during a certain week in October based upon the wholesale price in Chicago. This plan makes it unnecessary for the customer to be at the orchard on the opening date of the sale and insures him that he will get the variety and grades that he wants. The orchardist runs the risk of his customers failing him as they always have the right to cancel the order or leave it if he does not care to take it. Bookkeeping is multiplied and the possibility of error is much greater than by the sales date method. A satisfied customer is an asset to any business, and it is claimed that the customer appreciates the service which the booking of orders ahead of time gives him. Some growers make shipments to out of town customers, provided packing and handling charges are paid in addition to the fixed price.

Ready for the buyer to come and get them. These apples were sold as fast as they could be picked.

A third method of selling is through the grocery trade in towns situated near the orchard. Larger production is desirable in order that the trade may be supplied throughout the winter months. If such a trade can be established it becomes a very profitable one. It eliminates the jobber and commission man in the usual trade channel from producer to consumer but does not eliminate the retailer as is done in orchard selling.

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ALL INDIANA PRODUCTS
MJG

Indiana Federation of Farmers' Associations

By Dean J. H. Skinner.

(Editor's note: This is the second of a series of articles by Dean Skinner. The third will appear next month.)

THE Indiana Federation of Farmers' Associations was organized in Indianapolis several months before the preliminary meeting was held for the organization of the American Farm Bureau. Through the county agents and as a result of their work during the war many counties in the state had efficient county organizations of farmers with township committees to look after the interests of the producers of different agricultural products or commodities.

Indiana was one of the leading states in the great food production campaigns requested by the Federal Food Administration and the Department of Agriculture. The farmers of Indiana through these campaigns and efficient organizations were able to meet every call for food made upon them. Furthermore, they learned important lessons with reference to the value of organization and co-operation, and laid the foundation for county and state farmers' organizations, both of which are a definite organic part of the American Farm Bureau, although neither the state nor county organizations are called Farm Bureaus in Indiana. There were about sixty counties represented at the first organization meeting held in the Claypool Hotel at Indianapolis, March 25, 1919.

While a large number of the counties were organized previous to that time there was much difference of opinion as to the purpose and plan of organization needed to meet the situation or problems confronting agriculture. For several years Indiana had had an efficient agricultural extension department and county agent system connected with the agricultural college and carried on under the provisions of the Clore Act of 1911, the Vocational Act of 1913 and the Smith-Lever Act providing Federal funds for county agent work. The time and energies of these forces had been, and properly so, devoted to educational work chiefly along lines of more efficient production and rural betterment with little attention to problems of distribution, marketing, transportation, business and legislation. During the period of the war and immediately following, these problems became very acute and it was this situation that had much to do, in fact, was directly responsible for the organization of the Indiana Farmers' Federation.

The origin and purpose of the Federation is well expressed in the annual address of the President.

"The Farmers' Federation came into existence as a result of the position in which the farmer found himself when dealing with great social, educational and economic problems. Practically all other business, professions and occupations had organized to protect and further their interests. Farming interests, which represent greater production than all other interests combined, have been unorganized, and as producers have met organized buying with unorganized selling, and as consumers, have met organized selling with unorganized buying. It is a question not open for argument, that in the settlement of all great public questions, the interests bringing organization to bear upon the subject have a very great influence in securing a solution of the problem favorable to them.

The purpose of the Farmers' Organization is to give to the farmers of the State and Nation a well developed medium through which they may express their views and have an active part in the settlement of the questions of agricultural interest. We welcome the co-operation and assistance of all upright agricultural organizations, and wish to co-ordinate our efforts with theirs, to the end that all farming interests may unite under one common cause. The state organization is but a part of a big movement. The State Federation is not on a sound basis unless it is supported and upheld by strong county and township organizations to which the farmers may look for support on local questions, and through which they can speak to the State Federation on state and national questions. The state organization must not

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A New Treatment of Oats for Smut

By Dr. C. T. Gregory,
Botany Extension Department.

IN order to explain the changing of the oat smut treatment a short historical statement is necessary. The first treatment of oats for smut was to use one pint of formaldehyde in forty gallons of water and to sprinkle this solution on forty bushels of oats. The oat smut was serious and farmers were anxious to get rid of the disease so this treatment was quickly adopted. It was not long, however, till the plant doctor began to hear the farmer say: "Well, now, I just can't take the time to treat; it wets my oats all up and then I have to spread them out to dry. I'm all ready to plant and I guess I'll take a chance on the smut."

Demonstrating the new method of treating oats for smut at the recent Farmers' Short Course.

The farmer would not, or at least did not want to use the wet method of smut treatment, so it was necessary to find a better way. After some tests it was found that the pint of strong formaldehyde on forty bushels of oats did not hurt the grain and it did control the smut. This discovery led to formulating of the "dry method" of treating oats which is so well known everywhere. The one difficulty with this method is in the amount of gas released while spraying the formaldehyde onto the grain. It would almost smother the men doing the work. The reason it was necessary to use the spray gun in applying the solution in dry treatment was because there is so little solution that it cannot be evenly distributed throughout the pile of oats in any other way. To overcome this new difficulty and yet to retain all the advantages gained over the wet treatment, was now the problem. The only way out was to mix the pint of formaldehyde with enough water so that a sprinkling can can be used, and yet not enough water so that oats will be too wet to sow after a few hours. The new method was found after a thorough test.

One pint of formaldehyde is mixed with four or five gallons of water. This solution is sprinkled slowly on the forty bushels of oats as they are being shoveled from one pile to another, just as in the ordinary dry method. There is not enough gas released at this time to bother either operator. After the oats are shoveled over and the last of the solution is poured on them the pile is covered with a blanket or burlap sacks for at least five hours. It might appear as if five gallons of water on forty bushels of

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Pastures and Pasture Plants

By Prof. M. L. Fisher,
Head of the Agronomy Department.

AT about this time of the year there are always a good many inquiries about how to improve pastures, and how to get new pastures. The growth of the dairy industry is dependent upon cheap feed, and pasturage is one of the cheapest feeds for milk production. There are many acres of medium and low priced land in Indiana which can be made to produce pastures successfully, and consequently cheap feed. The questions asked usually fall into one of two classes. There are those inquiries which ask about temporary pastures; these, of course, are cared for by such crops as oats and barley sown together, clover sown without a nurse crop, sudan grass, or a mixture of oats and Canadian field peas. Where a hog pasture is wanted rape is usually the crop used. The other group of questions relate to permanent pastures. The permanent pasture is usually somewhat more expensive for first seeding and requires some time to come into full usefulness. The questions relative to permanent pasture are also of two kinds. One relates to how to strengthen old pastures, or native pastures, and the other relates to the laying down of new pastures. Many of the old pastures, and native pastures can be greatly improved by re-seeding, fertilizing, and resting. A native pasture that is partly woodland can be greatly improved by sowing additional seed. Such pastures usually have a good deal of Kentucky blue grass, some red top, and white clover in them. Occasionally these pastures have nothing but some wild grasses, wild legumes, and weeds. This is true of the hilly land in the southern part of the state. A sowing of ten pounds of Kentucky blue grass to the acre over a thin blue grass pasture, whether it is woodland or an open field during the month of February or March, will greatly improve the pasture quality of such areas. If the land seems to be somewhat sour, five or six pounds of Kentucky blue grass with four pounds of red top will be better than all blue grass. Orchard grass may be used on such areas, also.

Practically all pastures will be greatly benefited by some fertilization. Farmers do not regard fertilization as a necessary matter on pasture land, but this is a mistake. For many years animals have grazed these lands, and have produced milk or carcass out of the herbage. These products have been removed from the farm, and nothing has been returned to the land. Even the droppings from the animals have not been well distributed, consequently if the land is to continue to furnish good pasturage there must be some replacement of the material carried off. This can be done best by applying commercial fertilizer; two hundred pounds to the acre of a fertilizer carrying 3 or 4 per cent of nitrogen, 12 or 14 per cent of phosphoric acid, and 2 per cent of potash will give excellent results. This should be applied about the time when the grass begins to grow in the spring. If the farmer has plenty of stable manure so that four or five tons to the acre can be spread once a year, the fertilizer can be omitted, although even with the stable manure a hundred pounds to the acre of acid phosphate will be very helpful. Pastures will be greatly benefited by being harrowed with a spike-tooth harrow each spring. At all times the farmer should avoid over-pasturing his woodland or fields if he wishes permanency in his pasture. To have a pasture eaten down close in July and August will be sure to cause the burning out of a good many plants, and consequently a thinning of pasturage for the next year.

On woodland and abandoned fields where there are practically no native grasses, a sowing of four pounds of red top, ten pounds of Kentucky blue grass, and three pounds of white clover will greatly improve the pasturage. Orchard grass is also useful in most of such cases; ten pounds or more seed should be used per acre. On some of the very poorest hillsides in the extreme southern counties of the State lespedeza will be found useful. This should be sown in the spring, about fifteen pounds to the acre.

Where a new pasture is to be started on land which can be cultivated, it is best to start in the autumn by sowing the land to wheat, and with the wheat sow five or six pounds of timothy to the acre, and then in

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The Achievements That Have Thrust Boone County Calf Club Into the Limelight

By Prof. C. R. George.

ANYONE who believes in boys and girls and in their ability to do things, and who has faith in agriculture and hope for the future agriculture under the leadership of our present generation of boys and girls should visit the members of the Boone County (Indiana) Guernsey Calf Club. One or two whole days could be spent easily on these embryonic Guernsey breeding farms. The enthusiasm of its members spreads like an obnoxious weed, and before you are aware of it you have forgotten to ask if the club has been a success. Success beams on the face of every member whose home you visit. There is no doubt, you say to yourself, but that a dairy calf club properly organized and supervised and well supported by the parents and community can be the foundation for pure bred herds in the community that will be everlasting. It has been my own opportunity to visit these animal lovers in their homes. It was there while sitting on a stool behind one of the original calves which started the club that Morris Crain told me the story of the growth of the club. He talked as he worked and even when we were finished and in the house. I relate his answers to my questions as I remember them. The idea of having a Guernsey calf club for the boys and girls of Boone county was developed by Mr. P. H. Crane, a local Guernsey breeder, working in conjunction with dairy specialists from Purdue University. It was in response to the idea that the grain farms of this section afforded very little interest for the growing generation of children. There was a need for a change, a something to develop character, something containing life. Naturally the work began at home and was based on the idea that the most continuous course for training on the farm is in the care and development of a calf from its early months to the end of the first milking period. It was the cattle breeding idea that they wished to see developed and not the grow and sell idea. The plans were discussed with some neighbors, at first confidentially, but finally before a call meeting of farmers with their boys and girls present. The possibilities were very promising. They liked the permanent ownership

Five calves bred by members of Boone County's Calf Club Members and exhibited at the 1920 National Dairy Show at Chicago. Fancy Fanny, of Boone (extreme right), won 4th in the Junior heifer class. Dividend's Kitchener (extreme left) stood 5th in the Senior bull calf class.

section of the proposed constitution. The next man interviewed was Mr. James P. Staley, cashier of the Farmers' State Bank of Lebanon. Mr. Staley emphasized his hearty approval and intention of cooperation by saying as he was leaving the meeting, "Go to it, boys and girls, I'll back you, alright." Mr. Charles L. Hill, of Rosendale, Wisconsin, imported thirty purebred calves from the Island of Guernsey for the boys and girls in the club. The long journey across the water and thirty days in quarantine made these prospective calves look rather unpromising, but if those young folks felt the least rebuff they were not the kind to relent. The animals were drawn by lot and the work started. The first show came off. It was held four months after the distribution at Lebanon. It was here that both calves and young owners learned from the school of experience the art of appearing before the judge in one's Sunday clothes. The calves were judged and were then taken back home for further improvement. The second annual show was next and was held at Lebanon during the local dairy show. It was followed by the Indiana State Fair. Prizes were awarded and calf club members were very noticeable in the prize money. Home again, more feed, and care, and watchful waiting. The culminating point was not reached yet. Not even when one morning the individual owners of the heifers found that his heifer was now the proud mother of a purebred offspring. Yet, even though the owners were not aware of the fact, here wrapped in one of these little bundles of animal flesh was a thing which would bring unlooked for joy, at least, and we are inclined to say that the final climax has not been reached yet. The results at the National Dairy Show were most encouraging for the future. (We had finished milking now and were putting our hands to the fire while his mother prepared the meal).

Young Crain's eyes grew brighter. He saw again, as he related his story, that healthy little calf as it grew, and developed, and waxed stronger every way. Little did he know what awaited to crown his efforts as he patiently trained the young descendant of Guernsey Island to stand alert and show itself to the judge to be the animal it really was. The time did come and it was at the National Dairy Show at Chicago on October 10, 1920. The calves were in the ring. The judge was already making up his mind to make known the awards when the corner of his eye caught sight of something for which he had been searching, a thing to fill a vacancy. Away off next to the railing he sighted a young animal which was out of place. It was standing with the showing poise not like that of its immediate companions, but as if to say, "We are not beaten yet, as long as the show lasts." The spirit of its master must have been caught by the proud calf. Judge Kildee motioned to the boy and calf. It was our calf club boy. They came on and on until the judge indicated fourth place. Cheers broke forth from the crowd. The boy's face was radiant. The offspring from one of the original calves of the club had won a prize in our greatest dairy show in keen competition over calves owned and shown by men with long years of experience.

These boys and girls have fixed a standard. The first goal for which they were working was far below what has already been attained. Even the more aged advisors, I believe, did not foresee such marked success. The thing to me which seems so valuable is the fact that the club was permanent. The club ran longer than six months or a year. The calves were not sold early and the money spent by the members carelessly with no thought of whence it came. The three-year plan has taught each son and daughter in the club that "To Have and to Hold" is the true source of benefit to be derived in dairying. They are learning early the principles of mating good sires to good dams, and the outcome in the offspring.

'Tis plain to see that they are not going to stop at the end of the three years. Two additional calf clubs have already been organized in the same community for other boys and girls. The partnership formed between these first young members and their eager fathers will not be broken. Dairy herds have actually been started by them. Purebred herds are springing up all over the county. Bull associations are being formed. Young and old are interested in the growth and development of purebred livestock. Build up the community is their slogan. Make it the place for developing a breed which will be known to all people. These are men size ideas. They appeal to the good in us and call forth the best that we possess.

Contagious Abortion Disease

By Dr. G. H. Roberts,

Assistant Professor of Veterinary Science, Purdue University;
Associate Veterinarian, Agricultural Experiment Station.

ABORTION is now the second most insidious disease of cattle, the economic loss being almost equal to that of tuberculosis, and every layman interested in cattle should put forth every effort that lies within his power to prevent this disease from entering and infecting the cattle upon his farm.

The primary or exciting causative factor is now conceded by all the scientific investigators as the abortion bacillus, and the pregnant cow furnishes the fertile soil in her uterus for its propagation and development. The fact should not be overlooked that many of the troubles associated with abortion disease is not altogether due to this specific germ. Just what part these secondary organisms play in producing a retained placenta and sterility in aborting cows and white scours and pneumonia in calves is not definitely known.

Abortion disease can well be compared with some of the infectious and contagious diseases in other animals as cholera in hogs, distemper in dogs, influenza in horses, due to the fact that animals suffering from these diseases are susceptible to multiple complications that are more dangerous to life than the original disease. The most vital question is what is the principal source of dissemination? The purchase of an infected animal is the most prolific means of spreading the disease. A pregnant cow if harboring the germs of this disease in her uterus becomes a source of infection at the time of calving and will continue to discharge the disease-producing organisms through her genital organs until the uterus ceases to propagate the abortion bacillus. How long she will continue to be a carrier, whether aborting or giving birth to a normal calf, is not known. The bull is considered a carrier by coming in direct contact with affected cows and conveying the disease to the non-infected cows he serves. The disease is also disseminated through the herd by eating feed which has been contaminated by the discharges from an aborting animal.

The symptoms of contagious abortion disease are usually plain if an accurate history of the herd can be obtained. If more than one cow aborts, with or without a retained placenta, abortion disease must be suspected, although there are no symptoms that would lead to a positive diagnosis. Young cows or heifers aborting for the first time are liable to discharge a dead foetus at the third or fourth month of pregnancy, while older cows do not abort usually until about the seventh month. Premature live calves or normal calves from an aborter often suffer later from white scours or pneumonia. Calves nursing cows that are harboring the abortion bacillus in their udder are also liable to suffer from white scours or other dangerous diseases.

Laboratory blood examination is the only reliable method of diagnosing contagious abortion in cattle. When abortion is suspected in a herd a sample of blood should be collected from each animal in the herd and sent to a laboratory to be tested. The agglutination or the complement fixation tests are as reliable as any serological test.

If a cow reacts to either of the above tests, it is not positive proof that she will abort, but she may be a carrier and should be treated as an aborter.

The great economic loss is not only due to the failure of the cow to bring forth a healthy calf, but many cows become sterile either after the first or subsequent abortion. Sterility is becoming one of the most dreaded sequels to abortion disease.

Isolation for a reasonable length of time of a newly-purchased cow or bull from the home herd is imperative to insure safety. Public or private sales of infected animals should be prevented except for immediate slaughter. To purchase young breeding stock and allow them to associate with affected animals with the hope of building up a healthy herd is sure to be followed by disastrous results.

Prevention by the so-called abortion cures, largely composed of carbolic acid, have failed to give results when placed under experimental test. The Bureau of

(Continued on page 282)

"Learn by Doing"

By Grace King, '13,
Asst. State Leader Boys' and Girls' Clubs.

BOYS' and girls' club work is a demonstration. To demonstrate means to do—26,869 Indiana boys and girls have learned by doing in club work this year. Their achievements, in figures alone are not far from spectacular. 21,349 club members reporting produced products the total value of which is $441,867 with a profit of $218,411.

And yet granted that "money talks," this is a small part of the value of club work.

21 of these clubs finished 100 per cent.

25 of these clubs have fulfilled our state requirements for standard clubs and will be granted charters at the Club Round-Up.

47 of these clubs were canning clubs.

26 were baking clubs.

97 were sewing clubs.

5 were home keeping clubs.

2 cottage cheese and butter making clubs.

Some Outstanding Club Records.

Canning.

Lurine Leak, 16 years old, of Lizton, Hendricks County, who did third year sewing and home making projects the past summer, and won the State Sewing Club Contest.

Each club member—through instruction received, improved methods of work and the consciousness of his or her ability to do, gains self confidence, poise, business ability and a desire to achieve. This desire creates community leadership and is developed through the social life of the clubs, the club contests and other club activities.

The study of these statistics compiled from our 1920 reports on girls' club work will prove the point that each club member is a demonstrator in her community and that each club is a demonstration.

There were 178 girls' clubs with an enrollment of 2280.

Blanche Phillips, age 18, Frankfort, 556 quarts.

Edith Miller, age 14, Mauckport, 950 quarts.

Kathryne Bronner, age 16, Rockport, 560 quarts.

Laura McCutchan, age 17, Evansville, 572 quarts.

Adelle Davis, age 16, Lizton, 688 quarts.

Leona Campbell, age 15, Camden, 321 quarts.

Rossville Club of 6 girls, average, 142 quarts.

Columbus Club of 6 girls, average, 159 quarts.

Evansville Club of 10 girls, average, 196 quarts.

Dale Club of 18 girls, average, 211 quarts.

Mauckport Club of 11 girls, average, 188 quarts.

102 members canned more than 100 quarts each.

Total number of quarts canned by club members, 41,835.

Baking.

Maurine Catlin, age 13, Columbus, 209 yeast bread, 449 Q. B.

Mary E. Larkin, age 13, Columbus, 185 yeast bread, 30 Q. B., 40 bakings.

Ruth Rogers, age 17, Columbus, 127 yeast bread, 200 Q. B., 56 bakings.

Margaret Barrow, age 16, Corydon, 372 yeast bread, 62 bakings.

Esther Edison, age 15, South Bend, 107 yeast bread, 459 Q. B., 30 bakings.

Marguerite DeGratte, age 15, South Bend, 403 yeast bread, 392 Q. B., 80 bakings.

Kendle McCleadym, age 17, South Bend, 376 yeast bread, 392 Q. B., 72 bakings.

Total yeast bread, 11,288.

Total quick bread, 15,090.

Sewing.	N.G.	M.O.	P.	D.
Florence Pearse, South Bend, age 11, 2d yr.	11	1	1	1
Cora Kleine, South Bend, age 12, 2d yr.	12	1	1	1
Sylvia Hoover, Star City, age 14, 3d yr.	10	1	2	5
Madge Baker, Monticello, age 13, 2d yr.	13	1	12	10
Xeonocolea Hughes, Monticello, age 15, 2d yr.	14	1	1	2
Hilda Martin, Monticello, age 16, 2d yr.	15	....	8	7
Pauline Doss, Veedersburg, age 13, 2d yr.	14	2	1	6
Ruth Overpeck, Rockville, age 14, 2d yr.	14	2	2	2
Esta Winegardner, Logansport, age 17, 2d yr.	16	1	21	2
Krin English, Worthington, age 15, 3d yr.	13	2	....	....
Beatrice Vickery, Columbus, age 12, 1st yr.	13	....	4	6
Helen Bonnel, Columbus, age 16, 3d yr.	17	....	4	....
Virginia Blossing, Columbus, age 16, 3d yr.	20	....	....	....
Delight Wies, Matthews, age 15, 3d yr.	16	....	....	....
Dorothy Park, Amo, age 14, 2d yr.	15	6	3	10
Lucy Pondenhamer, Stilesville, age 16, 2d yr.	20	15	3	18
Lena Brewer, Stilesville, age 17, 2d yr.	18	12	4	15
Alice Leak, Stilesville, age 15, 2d yr.	18	11	3	8

These quotations from local club leaders best express the appreciation of the value of club work.

"The one striking feature of the work among the people of the different communities was the good friendly spirit that seemed to exist. The club girls of one township would entertain the girls of another, and if any problems had been encountered they would exchange ideas upon them."

"The mothers, particularly, seemed to manifest a great deal of interest. One mother remarked, 'My daughter simply did not like sewing in school, and cried because she had to take it, but since joining the club she has learned to like it, and I can't keep her away from the machine.' The one thing that this particular girl needed to learn was 'self-reliance,' and after she found out she really could do things it was easy for her. This is the big lesson in club work."

"My greatest enjoyment was not so much in the girls to whom the work came easily and who had encouragement in the home, but in the several little girls who did not have the home environment to make life easy. In one case three little sisters, the oldest one fourteen, were motherless and were doing the housework, but never had attempted to sew. Their work was not so well done as that of some of the other girls, but it meant a great deal to them to be able to make the simple little articles found in the first year work."

It will soon be time to fix up the hotbeds for forcing early vegetables and starting plants. The sash may be gone over now, broken glass replaced and repair work done on the frames so when the time arrives for fixing up the beds everything will be in readiness. Home grown lettuce, radishes, etc., which have been forced may appear on the farmer's table while the city man is still paying a fancy price for an inferior article which has been shipped in from the south.

Correct Methods of Incubation Pay

By J. T. Morrison, '22.

TO every farm, large or small, where the hen and her products are counted among the commercial assets of the farm and where a real effort toward the growth of healthy, vigorous stock is expended, March brings up the question of incubation. Primarily the purpose of this problem is to secure from a given number of eggs as many vigorous, healthy chicks as possible. To do this with any degree of success there are a few primary essentials that must be observed. The eggs should be carefully selected, using only those known to come from healthy, vigorous stock. They should be of uniform color to secure uniformity of chicks, of uniform shape to be easily handled, and of good shell texture to secure ample protection for the young chick. Small, irregular shaped eggs are never profitable, as the chicks hatched will be weak in vitality, carrying with them the tendency to transmit to future generations just such a lack of vitality.

If there is to be any lapse of time between the buying or securing of the eggs and the setting of them, say from one to two weeks, they should be kept in a cool room with a temperature of about 50 degrees and turned daily. There are many turning devices on the market, but the most economical of these is the ordinary egg case which can be turned over by the hands. Revolving tables may also be used to an advantage. It is inadvisable to keep these eggs in storage longer than two weeks.

Between the question of natural and artificial incubation there is not much choice as to the most efficient. Either method gives satisfactory results. The one used will depend primarily upon the number of eggs to be incubated. Where eggs are incubated on a large scale to meet a commercial demand the incubator is by far the most economical, but for the average farmer the cheapest in labor and capital is the natural method of using the sitting hen. In the event natural incubation is used, cleanliness is of primary importance as well as a careful selection of docile, faithful sitters. These sitters and their nests should be separated from the rest of the flock. Nests made from boxes or other strong material may be placed in rows on the ground or, what is more advisable, in a row around the darkened sides of a small shed. After a careful cleaning with disinfectant the nest material is made from short cut straw. The short cut straw is preferable because it leaves no holes for the eggs to get into and become chilled.

Throughout the period of incubation these hens must be watched carefully to see that each gets back to her nest, and that there are no eggs broken. The hens should be dusted with insect powder now and then, as should also the nests. In the event of a broken egg the nest should be thoroughly cleaned, washing the remaining eggs in tepid water.

When the chicks begin to hatch the coop should be shut for a day or two as the sight of food is likely to cause the hen to leave her nest and the chicks become chilled. This is a critical period in the brooding and too much care cannot be exercised.

As in the use of an incubator the eggs should be candled on the seventh and fourteenth days, thereby eliminating the infertile eggs and the eggs containing dead germs. If left these are the eggs most likely to break.

The necessity of incubating eggs on a large scale with the minimum of labor has brought the development of artificial incubation to a high degree of efficiency. The incubator can be set at any time, can hatch eggs earlier and in larger numbers without the time lost in the care of hens, and can be operated with less danger of loss of hatch. With a minimum of labor, maximum efficiency can be reached, the chicks can be hatched under the most sanitary conditions, and as a result will not be infested with mites, lice, or other pests. The chances of infection are minimized, and in the light of modern reliability of incubators, can be operated on the most economical basis.

However, there are certain advantages to look for and certain disadvantages not to be overlooked in the selection of an incubator. Consider the type of construction

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Did You Know This?

THE Moses Fell Farm, consisting of 440 acres, near Bedford, Ind., was given to the University by M. F. Dunn and Antionette Fell in 1914. Forty-four lines of investigation are in progress on the farm under the direction of the Experiment Station. Fifty-five acres are devoted to young and old orchards, and the remainder is given over to general farming and live stock production.

The Herbert C. Davis Forestry Farm, containing 385 acres, in Randolph County, was given to the University by Mrs. Martha F. Davis as a memorial to her son, Herbert C. Davis. One hundred and thirty-five acres are forested and are to be preserved in their native condition with wild animals, trees, plants and flowers protected. The remainder of the farm is under cultivation. The University takes charge on Dec. 1, 1921.

Wm. E. Pinney gave the University the Pinney-Purdue Farm of 400 acres and the Pinney-Purdue experiment field of 67 acres, both near Wanatah, Indiana, for the development of agricultural information and the improvement of country life. Work in soil fertility, crop production, and herd improvement is in progress here. Herds of purebred Duroc-Jerseys, Red Polled cattle, and Shropshire sheep are maintained here.

The Agronomy Farm, operated by the Soils and Crops Department of the Experiment Station, consists of 120 acres just east of LaFayette. Some of the most comprehensive experiments in the United States in soil fertility and crop production are in progress on this farm. One of the outstanding pieces of work at the present time is the developing of the Champion oats.

A 20-acre orchard is maintained for experimental purposes by the Station near Mitchell.

The Station has leased the Cason Farm of 120 acres, three and one-half miles northwest of LaFayette, and expects to own it eventually.

By completing a record on February 15 of 14102.1 pounds of milk and around 752.35 pounds of fat, Purdue's Golden Estelle displaces Fawnett's Maiden as champion of all ages of the Jersey breed in Indiana.

The highest seven-day record of production ever made in the Purdue herd has recently been made by Princess Mercedes Segis on a seven-day test. She made 560 pounds of milk and lacked only fourteen-hundredths of a pound of fat of reaching the coveted thirty-pound class. Following this seven-day test, her milk production increased until it passed the hundred pounds a day mark. As a junior four-year-old she made about 15,000 pounds of milk and 650 pounds of butter.

Purdue's herd is one of the three herds of the State that has qualified for the State Dairy Association 400-pound cow club.

The Ayrshire cow, Bagora's Fizaway, produced 1800 pounds of milk and 80 pounds of fat in January.

The Junior Holstein herd sire on the University Farm, Paul Fobes Butter King, who was grand champion two-year-old bull at the Indiana State Fair in 1920, is a brother to Iowana Sir Ollie, who was grand champion of the National Dairy Show in 1919, and who is the sire of the youngest two-year-old in the Holstein breed to make 1000 pounds of butter in 365 days.

The Purdue Creamery is one of the three largest college creameries in the United States. For the fiscal year ending October first, it produced 225,833 pounds of butter, 21,496 quarts of milk, 63,057 gallons of buttermilk, and 46,463 pints of sweet cream. This is largely sold in LaFayette, although the surplus butter is marketed in several large Indiana towns, and in New York and Chicago.

The Purdue Entomology Department is the first to make an accurate check on the time of emergence of the first and second broods of codling moths. Heretofore the idea had prevailed that there was a distinct division between the two broods and the spray schedule was arranged accordingly. However, this work which was continued through several summers showed that there was a steady emergence of moths from the first of May till the first of September, with no perceptible division between the two broods. Consequently a revision of the spray schedule has followed as a result of this work.

The latest addition to the creamery is a glass lined steel vat for the manufacture of cultured buttermilk. This is the most sanitary vat for the purpose, and incidentally the most expensive.

THE PURDUE AGRICULTURIST

Published monthly during the school year, by Agricultural Students of Purdue University, LaFayette, Indiana.

MEMBER OF AGRICULTURAL COLLEGE MAGAZINES

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The purpose of THE PURDUE AGRICULTURIST is to disseminate the latest scientific knowledge concerning Agriculture and Home Economics, to incite the young people of Indiana to a greater desire for training in Agriculture and in the industrial pursuits, to publish matters of interest concerning the Purdue School of Agriculture and the Purdue Experiment Station, and to afford opportunity to the students for training in Agricultural journalism.

INDIANA'S HERDS AND FLOCKS.

Probably the average Hoosier farmer, when reading the stirring accounts of show-yard and sale-ring triumphs, either past or present, fails to realize and appreciate the fact that Indiana has played no minor role in our national livestock development. When casting about for seed stock to replenish our flocks and herds, we often go to some distant breeder when we might in many cases more profitably go to men of our own State. The whole trouble seems to be that we do not know enough about Indiana's livestock, and have not yet begun to treasure Hoosier livestock lore and traditions.

In a recent editorial The Breeder's Gazette comments as follows: "Tom Bradburne is an artist, no, not a painter, a sculptor or anything ordinary like that; but one of those who have the gift of turning out beautifully modeled, perfectly fitted animals such as we all ought to admire and study in the great show-yards of the country. No follower of The Gazette's show reports for the past twenty years needs to be told who he is or where he now is."

This editorial from the ranking livestock journal of the country leads us to wonder how many of our readers "know" who Tom Bradburne is or where he now is." How many Purdue students have ever met Tom or seen the products of his skill? It seems that breeders and fitters of stock, like prophets, are "not without honor save in their own country." But it is high time that we begin to yield Indiana breeders and their products the rich and merited honors so freely accorded them by others. It is high time that we study show-yard annals and learn what Hoosier breeders have done. Hereford history has no brighter pages than those graced with the tales of the achievements of Shadeland Farm in its balmy days. Shorthorn annals resound with the victories of Choice Goods, once owned by J. G. Robbins & Son of Horace, Ind. For years Thorntown has been the recognized hog center of the world. The Pines has produced more grand champion fat wethers in recent years than any other farm. The Huntertown community is becoming nationally famous for its Shorthorns and Belgians; while the breeding of Guernseys as a Boys' and Girls' Club project has made Boone County equally famous. And where in all the livestock world today can a more outstanding breeding establishment be found than the Orchard Lake Stock Farm of our own Governor Warren T. McCray?

But why enumerate further? The above names, selected at random, prove that the best can be produced right here in Indiana. Let us, then, get behind every effort being made to raise the standards of our herds and flocks; and as evidence of our faith in the cause of "Better Livestock" let us give due recognition to those who have helped to put us where we are today.

UNDERCLASSMEN, ARE YOU UP TO DATE?

There is a marked tendency among the Agricultural students, noticeable most among the underclassmen, to apply themselves to a schedule consisting of a round of classes, three meals, and ten hours of sleep varied occasionally by a game or a movie. The class room walls mark the limit and scope of their vision. How about it, underclassmen? Could you pass a test in Purdue farm lore, naming the experiments under observation in the different departments, and explaining the results to be obtained by them. In other words, is the knowledge of your profession "up-to-date"? When you go back to your home community could you answer the many questions that will be asked about the work at Purdue? If you cannot, you have missed the half of your college course.

When you came to Purdue it was to train your mind to see things as they are, to interpret more clearly the latest developments in the field of Agriculture, and to be able to return to your community and use that knowledge in worthwhile service.

The Agriculturist for this month contains a new section, devoted entirely to news about the farm. We are trying by this page to bring home to the farmers of the State, as well as to the underclassmen, the work Purdue is doing. On it you will find live items of personal news, "inside dope" so to speak, of the management of the Purdue farms.

THE ORCHARD.

If a dormant spray has not been applied since last November, a lime sulphur spray should be given before the buds burst in April or May in order to control the scale insects, and to serve as a sanitary measure. A later spray of dormant strength would injure the foliage, although a few experienced fruit growers who are able to recognize the proper time to avoid burning, combine the dormant spray and the first summer spray.

For the dormant spray, concentrated lime-sulfur, diluted to test five degrees Baume, which would ordinarily mean six gallons of lime-sulfur to 50 gallons of water, is used. This application is both curative and preventive, so great care should be exercised to cover completely every inch of the trunk and limbs with spray material. Saving spray material is false economy, as one scale left alive may reinfest the entire tree.

State Entomologist Wallace states that the peach crop when injured by cold weather suffers in the fall and spring, and that the crop has never been killed in February. So far this year the crop in the southern part of the state has escaped injury, and the chief remaining danger is in the spring at blossoming time. However, the peach stands more frost than the apple or cherry unless it is just at the time that the shucks fall. Consequently the peach prospects for next year are very good at present, except in the orchards that are scattered over the northern part where it is thought that the mild weather induced growth last fall, and then the freezing killed.

NIGHT RIDERS OR FEDERATION?

The press is replete with reports concerning the outrages of the famous night riders in the southern states. Crops have been destroyed and farmers intimidated in various ways. They are fast becoming a nuisance. Originally they were organized in the interest of securing adequate prices for their huge tobacco crop from monopolistic companies. Apparently they were successful with these methods for a few years. Now, however, trouble has broken out again.

Perhaps the methods used by the Indiana Farmers' Federation, that of thorough investigation and education, are best after all. Truly they are not so spectacular. But in the results gained will they not be more powerful? Maybe you are dissatisfied with the slow progress made. Remember that a new limb cannot be grafted on an old tree in a moment. Indiana farmers are making marked advances. In comparison with the south we should be heartily satisfied with our "bloodless victories."

Perhaps it is to disprove the saying, "Little children should be seen and not heard," that modern girls decree their "little ears shall hear but not be seen."—Topics of the Day.

In these days of adulteration first thing we know they'll be running milk trains without a cowcatcher.—Topics of the Day.

No man ever regrets the good he does for his wife and "Mother." Too often his acts and thoughtfulness and care come too late and remain a source of deep regret for all his lifetime.

"Mother" deserves your consideration. Her daily farm tasks are often endless and discouraging. Give her proper tools to work with—equip the home with Swartz-Light, that she may have power to do the work.

Makes Life More Worth Living for All

Instead of "Mother" doing the washing—killing herself with a disagreeable task—the Swartz Light will do it for her. It will help her iron the easy way—with an electric iron. **It saves Mother's strength and years.** Get it for her sake. **She deserves it.**

And for Dad and the boys, Swartz Light does wonders. Saws the wood, cleans the grain, grinds the feed, lights the buildings, gives running water, saves hours of time daily, and the salary of one or more men. Write for catalog and how "It Saves Mother."

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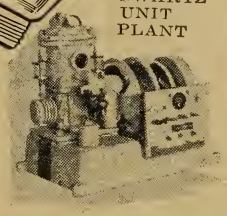

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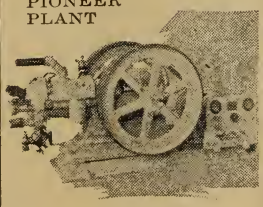

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Swartz Light will save Mother the back-breaking, age-quickening tasks that she was never made to do.

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Swartz Light removes those tiring tasks such as the hot work of ironing, by supplying power for an electric iron. It eases things for Mother. Swartz Light makes all her household duties simpler—gives her more time to spend with the family and to do all her daily tasks quicker and easier.

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Alumni and Local

SEND POULTRY EXHIBIT TO INDIANAPOLIS SHOW.

The Poultry Division of the Purdue University Extension Department took an educational exhibit to the Indianapolis Poultry Show, held at Tomlinson Hall, February 9-13. Prof. A. G. Phillips, L. L. Jones and C. W. Carrick made the trip in charge of the exhibit. A Purdue poultry house 10x12 feet, with live birds, was the special feature.

MAJOR E. G. BYERS '17, WRITES TO DEAN SKINNER.

Dean Skinner has lately received a letter from Major E. G. Byers, who is doing extension work in China. Major Byers graduated from Purdue in 1917, after a very active life in student affairs. During the war he was a Major of Artillery at Camp Zachary Taylor, and at the close of the war returned as executive officer of the R. O. T. C. unit here. Last June he was sent to China on agricultural work. In his letter he pictures Chinese agricultural needs and possibilities, and the wonderful openings there are for work along this line.

AG. SOCIETY ELECTS OFFICERS.

Officers were elected at the meeting of the Agricultural Society held Tuesday, February 8th, with the following results: President, F. G. Hemmer; vice-president, L. B. Wilson; secretary, G. H. Powers; treasurer, C. R. Beard.

The speaker of the evening was Mr. H. J. Reed, assistant director of the Experiment Station, who discussed the things a person learns at college and after he leaves. He emphasized the needs of a training in thoroughness and approach and advanced the theory that there were as many different kinds of jobs as there were individuals, and that each man should pick his field. He closed the talk with a discussion of the opportunities in business of a graduate from an Agricultural school.

PURDUE MAT TEAM DOWNS IOWA.

The Purdue wrestling team continued to show unusual strength and downed Iowa by the decisive score of 34 to 22, Iowa only winning two out of the entire seven events on the card. This places Purdue as one of the strongest teams in the Conference, since Iowa has beaten Northwestern and Minnesota by overwhelming scores and Purdue had previously taken the measure of the Ohio State grapplers. Coach Schrader of the Iowa squad praised the work of the Boilermaker squad.

PURDUE WINS INDOOR MEET WITH CHICAGO.

Purdue annexed her first indoor track meet of the season by downing Chicago, 47 to 39. The Boilermakers demonstrated the fact that they had a well-balanced team by placing in almost all events and by winning the first two places in a majority of the events.

Chicago was rated as one of the surely good teams in the Conference, and this victory places Purdue in the Conference limelight. In this meet Furnas was easily the star, winning two firsts in the mile and two mile respectively. Three Purdue men, Teal, Butterfield, and Pence, won first and the coveted letter.

PURDUE THIRD IN CONFERENCE BASKETBALL.

Purdue, by coming back and soundly drubbing Ohio State, 41-23, again placed third in Conference basketball standing. The showing made by the small but speedy Purdue team this year has been nothing short of phenomenal. Handicapped by having only two men of last year's freshman varsity eligible, Purdue has met and defeated Indiana, Northwestern, Ohio twice, and lost to the taller, heavier teams of Illinois and Michigan.

Purdue goes out this week for the first game of a five-game road trip, returning here to play Iowa for the last Conference game of the season. With fair luck on this road trip, Purdue should annex three out of the five games played and finish among the first three in the Conference.

Some poor city children visited a farm. Each was given a glass of milk. "Well, boys, how do you like it?" "Fine. I wish our milkman had a cow."—Topics of the Day.

RESOLUTIONS OF THE INDIANA CORN GROWERS' ASSOCIATION.

A note of optimism for the future was expressed by the resolutions adopted at the annual meeting of the Indiana Corn Growers' Association during the farmers' short course at Purdue University. After indorsing the five acre corn contest work; boys' corn club project; the seed certification work undertaken; the bill before the legislature on this topic; and more liberal support for the Purdue Agricultural Experiment Station; the resolutions read

MR. C. A. BROWN,
President of the Indiana Corn Growers' Association.

"We believe that ultimately better conditions will prevail and earnestly hope that the Indiana farmers will do their full share in stabilizing the thought and action of our people. As an aid in securing greater profits that must prevail if agriculture continues on a permanent basis, we respectfully recommend such careful studying and such changes in procedure as will secure the greatest unit of production at the least possible cost, at this time when there is an apparent sufficient production of foodstuffs. Therefore, the problem of the farmers is to produce this supply from the lessened acreage. This can be done by applying the best known principles of soil and crop improvement, the production of adaptable varieties of the highest quality, the elimination of diseases, and using the best known cultural methods."

Charles A. Brown, Franklin, a veteran corn grower and showman, was named president. Peter J. Lux, winner of the national honors in 1920, was chosen vice-president, and Prof. G. I. Christie, of Purdue, secretary-treasurer. The district vice-presidents are: Glen Smiley, Rochester; E. B. Moore, Scircleville; Edward Sturm, Dana; J. D. Hull, Columbus; J. A. McCarty, Evansville.

The Purdue Agriculturist Essay Contest

A LIST of prizes which already greatly exceeds that of last year, will be offered in connection with the 1921 Prize Essay Contest conducted annually by the Purdue Agriculturist. As yet, a full list can not be published because more donations are yet to be received. These prizes nave not been assigned to the various departments of the contest, and will not be until all donations have been received.

Sixteen magazines have contributed 161 one year, 12 two year, 1 three year, and 1 five year subscriptions to be used as prizes. The total value of the donations received so far is $212.00.

The object of the contest is to foster the interest of the High School students in present Agricultural problems. The contest is so arranged that all the students in the 68 Indiana High Schools having an Agricultural Vocational department may enter essays. The essays are divided into six departments: Animal Husbandry, Dairy, Poultry, Agronomy, Horticulture and Entomology, and General and Farm Management.

In each school, the best essay in each department is selected and sent to Purdue to compete with those from other schools in the State Contest. First, second and third prizes are given in each of the six departments in the State contest.

Copies of the essays winning in each department will be sent to several magazines which have requested them for publication. The winning essays will be announced and prizes awarded at the Boys' and Girls' Round-up, which is to be held at Purdue during the first part of May.

Inquiries From Our Readers

Let Us Help Solve Your Problems—Purdue Stands for Service.

Ration for the Dairy Cow.

Question.—What is an economical ration to feed a dairy cow during the month of March? I raise corn, alfalfa and oats on the farm and am willing to buy feed in moderate amounts.—R. A. K., Knox County.

Answer.—Use corn silage and alfalfa hay as roughages, and the following grain ration measured by weight:

4 parts ground corn
2 parts ground oats
½ part oil meal
½ part cotton seed meal

Feed at the rate of one pound of grain for every found pounds Holstein or Ayrshire milk, and one pound grain for every three pounds of Guernsey or Jersey milk.

Apple Varieties for Southern Indiana.

Question.—What varieties of apples are best suited to the southern part of Indiana, and how many varieties should be used in a ten-acre orchard?

Answer.—Ordinarily it is recommended that not more than two or three varieties of apples be grown in the small commercial orchard. For the southern part of the state the following varieties will do very well: Grimes Golden, Stayman Winesap, Jonathan, Winesap, Delicious, Rome Beauty, and Ben Davis. The Grimes Golden and Jonathan are probably most in favor at the present time, although the susceptibility of the Jonathan to fruit spot and fire blight are against that variety.

Remedy for Sheep Ticks.

Question.—What is an effective remedy for the sheep tick?

Answer.—Dipping in the commercial coal-tar, creosote, arsenical, or nicotine dips, such as "Kreso," "Creolin," etc., is most effective but necessitates the construction of a dipping tank and is therefore practical only where large flocks are to be treated. Applications may be made by hand, using a brush or cloth, or may be sprayed on the animals with a bucket pump. To be most effective applications should be made when the wool is short and treatment with liquids should be used with great care during very cold weather, at which time only a small amount may be brushed over the coat. In the winter months, when the long wool will not permit of other treatment, a partial control can be obtained by the use of fresh pyrethrum powder which should be freely blown deep into the fleece over all parts of the body.

Preventing Cabbage Maggots.

Question.—What can be done to prevent maggots which attack the roots of cabbage? —Mrs. H. J. W., Allen County.

Answer.—The cabbage maggot can be controlled effectively by treating with corrosive sublimate in solution. Cabbage plants should preferably be grown under cheesecloth screens to prevent infestation in the seed bed. Within three to six days after transplanting, the corrosive sublimate treatment should be made, a second application about 6 days after the first, and a third 10 days after the second. The solution to be used is prepared by dissolving ½ oz. of corrosive sublimate in a small amount of water and diluting to make 6 gallons. A half cupful is applied to each plant. The same remedy will be useful against the same maggot attacking radish. The onion maggot, while closely related, is not readily controlled by the above method.

Soybeans for Hay.

Question.—What, in detail, are the best methods for soybean culture for hay?—H. W. C., Clay County.

Answer.—The best time to plant soybeans is just after corn planting time. As a general average, the seeding drilled solid with a wheat drill at the rate of 60 pounds to the acre is the most profitable for hay production. As to varieties, the Ito San and Early Brown are good for the extreme northern part of the State, the Sable type is a favorite in central Indiana, and the Mammoth Yellow makes a good growth in southern Indiana. Soybeans are ready to harvest for hay when the beans are in the milk stage.

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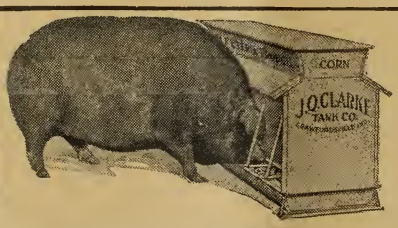

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THE OX WARBLE.

By Roy Magruder, '22.

CATTLEMEN and farmers generally do not realize the importance of the ox warble because it very seldom causes the death of the affected animal. Too often the poor showing of the cow at the pail or the failure to take on flesh, is attributed to poor care, lack of nourishment or some physiological trouble, while in truth the cause may be a warble infestation. In several cases noted it has been found that the presence of grubs has reduced the yield of milk 25 per cent. The carcasses of cattle badly infested with the grubs are not fit for consumption due to the green and jelly-like masses surrounding the tumors. An illustration of the effect of the warble is shown in the case of a fifteen months Hereford heifer in Wayne County, Ohio, from which 91 grubs were taken. It weighed only 325 pounds, not more than half the normal weight of an animal of that age. Of course, this is an extreme case, but perhaps in the spring you will find these grubs in some of your cattle which are not thriving as they should.

The holes left by the emerging grubs cause an additional loss in that the value of such hides is reduced a third, and considering the number of animals in the United States which are affected this loss alone would amount to several million dollars per year.

The adult insect which is responsible for these grubs, is very similar in appearance to the bot-fly or "nit" fly. It is however somewhat larger and covered with more hairs. Being of a timid nature and appearing only when everything is quiet it is very seldom seen. Its eggs may be laid on almost any part of the body, having been found on the legs, feet, shoulders, rump, belly and flanks. Deposition occurs from late spring to early fall. The eggs hatch in about a week and the animal upon licking itself, carries the larva into its mouth, down to the esophagus and sometimes into the gullet. This is the oldest explanation of the mode of entering the body, but the latest theory is that they hatch and burrow directly under the skin and begin their migration toward the back. Credence is given this latter explanation by many of our foremost entomologists, but it is not universally accepted as yet. The larva having entered

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Sulphate of Ammonia

Fine Physical Condition

In the selection of chemicals for fertilizing purposes, whether it be for the mixture or for use as a separate application, good physical condition is a factor of prime importance.

Most of the mineral carriers of nitrogen are hygroscopic, having the undesirable property of absorbing moisture from the air. Examples of these are the nitrate salts of ammonia, calcium, sodium, etc.

The use of such materials in the mixture is limited to small amounts, because of their tendencies to produce a sticky mixture which on standing is apt to harden and cake. Modern farm practice demands that the fertilizer mixture be fine and dry for easy distribution by machine.

When used alone for top-dressing or side-dressing purposes, hygroscopic salts, because of their tendency to cake quickly, generally require regrinding immediately before using. This operation, when done by the farmer, costs several dollars per ton and often results in much delay just at the rush season.

Sulphate of Ammonia is a non-hygroscopic nitrogenous chemical. For years the fertilizer manufacturer has been willing to buy it at a premium, because of its good physical properties. Recently to meet the call for a quickly available top-dressing fertilizer in good condition, we have placed at the disposal of the grower a kiln-dried and screened *Sulphate of Ammonia* under the trade name *Arcadian*.

Arcadian Sulphate of Ammonia comes in fine and dry condition. It does not absorb appreciable amounts of moisture from the air. If stored in a reasonably dry place it will maintain its fine physical properties indefinitely.

Arcadian is meeting the approval of growers in all sections of the United States and is saving them several dollars per ton on the cost of application. They can empty *Arcadian* from the bag directly into the fertilizer distributor or grain drill and apply it easily and uniformly.

Arcadian Sulphate of Ammonia furnishes an all-soluble, quickly-available, and non-leaching form of nitrogen. It is a "made in America" product. The guaranteed analysis is 25¼% ammonia.

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AGRICULTURAL DEPARTMENT

the body soon makes its way just underneath the skin and works toward the back of the animal. Lumps will be noticed about mid-winter, gradually getting larger until late spring. The larva then leaves the body through the hole previously used for breathing and falls to the ground, where it burrows into the ground and passes into the pupa stage. The adult fly emerges three to five weeks later, the total life cycle being completed in one year.

Due to the fact that all of the insects are in the backs of cattle in the late winter and early spring, removal of the grubs at this time is the easiest method of control. If everyone would, in this way, remove the grubs from his cattle and destroy them there would be no nucleus for the next season's generation. Cooperative associations in France and Denmark have followed the plan of interesting all cattle owners in removing the grubs from the cattle and consequently the amount of damage is greatly reduced. It is easier to remove the grub by letting it mature and then by pressure on both sides of the tumor to force the grub out. Care should be taken to destroy grubs removed as otherwise they will enter the soil and complete their transformation. Removing may be done earlier in the season while the grub is still firm to the touch by enlarging the opening with a lancet and then taking the larva out by means of a pair of slender forceps. An application of carbolated salve will aid in healing the wound and in addition will keep annoying insects away.

May 2-3-4-5 DATE OF THIRTEENTH ANNUAL PURDUE EGG SHOW.

The Purdue Egg Show was the first egg show in America. This year's show, which will be the thirteenth annual show, will be held on May 2, 3, 4, 5, inclusive, in Agricultural Hall, at Purdue University, West Lafayette, Indiana. A committee of eight men, elected by the freshman class, is in charge of the show. They are: Claire W. Jackson, president; C. C. Hadley, vice-president; W. P. Watson, secretary; W. R. Amick, treasurer; George Fross, publicity; W. J. Emerson, superintendent; F. C. Miller, assistant superintendent, and D. B. Thomas, business manager.

There are seven classes under which eggs may be entered:

Class 1—Open to Experiment Station and Universities.

Class 2—Open to Purdue students only.

Class 3—Open to the mayors of Indiana cities.

Class 4—Open to any state governor or ex-governor.

Class 5—Open to all farmers and commercial egg producers.

Class 6—Open to any one not a student of Purdue University.

Class 7—Open to the students of Indiana Public Schools.

All judging will be done by the use of the official score-card. A catalogue explaining the score-card, naming the judge, and giving all the classes in full will be published soon, and may be acquired by addressing the secretary, W. P. Watson, West Lafayette, Indiana.

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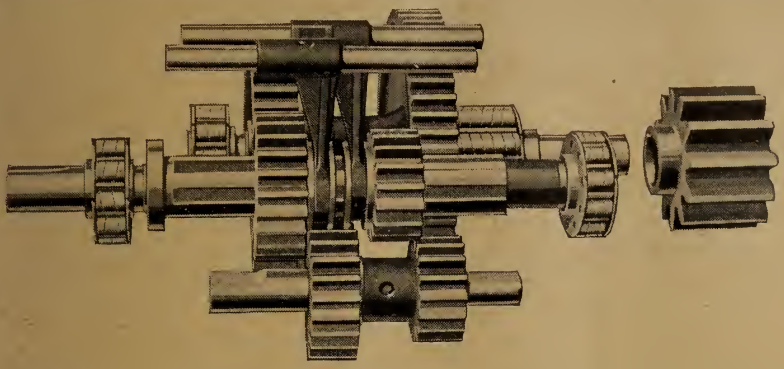

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PASTURES AND PASTURE PLANTS.

(Continued from page 258)

the spring, in March, sow ten or twelve pounds of Kentucky blue grass, and four pounds of alsike clover to the acre. A good many farmers do not sow Kentucky blue grass because of the high cost of seed. It is not advisable to sow less than ten pounds to an acre. The price per pound for the seed usually frightens the farmer out of sowing it, but if he wants a permanent pasture he should remember that a pasture can not easily be obtained without sowing plenty of seed. The cheapest sowing is to sow timothy and alsike. Seven and one-half pounds of timothy and four pounds of alsike to the acre will make a good pasture, is pretty sure to set, and is about as cheap as can be had. Its lifetime, however, would not be as long as where Kentucky blue grass is added to the seeding. Many farmers prefer to use red clover instead of alsike. The lifetime of red clover is less than that of alsike. On the rolling land of the State where it is possible to plow and to sow wheat or oats a combination of timothy and alsike is one of the very best.

For land that is poorly drained five pounds of red top and four pounds of alsike will give good results. For rather dry sandy soil timothy and alfalfa may be tried.

Timothy is recommended not because it is a real pasture grass, for it is a better hay grass than pasture grass, but because of the certainty with which it will grow and the cheapness of the seed. Kentucky blue grass is a superior pasture grass. There is no better pasture grass for Indiana than this plant. It is rather slow in getting started, and usually requires two or three years before it makes a good showing. However, on some of the peat soils of northern Indiana it makes a good sod the first season. Orchard grass is quite well adapted to the hilly land of southern Indiana, but because it grows in bunches it does not make a good sod like Kentucky blue grass. Red top is a very dependable grass, and the seed usually germinates quite well. It is adapted to land which is more or less sour, better than the Kentucky blue grass. If the land is very sour it ought to be limed before attempting to get a good sod of Kentucky blue grass. The red top, however, is adapted to all conditions of soil. It does well on poorly drained land and dry soils, on land that is sour, and on land that is sweet. It does not make the heavy, stiff sod that the blue grass does, and is somewhat slow in starting in the spring. Alsike and white clover can be recommended for any place in Indiana, and on practically any kind of soil. Red clover is, of course, adapted best to good land, which is well drained and sweet. Lespedeza can be recommended only for the poor hillsides of the extreme southern part of the State. There are many other species of grass like meadow fescue (English blue grass), smooth brome grass, sheep's fescue, perennial rye grass, and Italian rye grass, but these have not been largely used in this State. The last two named are not hardy enough to stand our winters.

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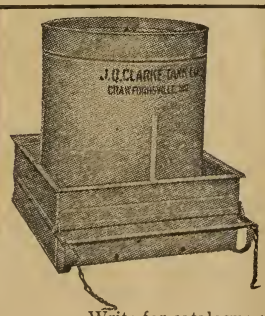

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NEW TREATMENT FOR OATS SMUT.

(Continued from page 257)

oats would make them wet, but the water is entirely absorbed by the grain with no swelling whatever. After five hours the grain can be sown just as if it had not been treated. The water does not prevent the releasing of the gas which kills the smut. If less than forty bushels of oats are to be treated, then the pint of formaldehyde and the the five gallons of water should be divided to represent the proportion of oats taken.

The first question raised by the farmer is, "When can these treated oats be sacked?" If they are to be sown immediately it will be all right to sack them after they have been covered for five hours. In case the grain is to be left for some time in the sacks the piles should be spread out to allow the gas to escape thoroughly.

The whole subject of treating oats for smut can be summed up in a few sentences.

1. One pint of formaldehyde to forty bushels of oats is the important consideration in the treatment. Smaller amounts of oats must use proportionately smaller amounts of formaldehyde.

2. The five gallons of water with a pint of formaldehyde does not affect the killing power of the formaldehyde. For less than forty bushels of grain the five gallons of water ought to be decreased proportionately so that the grain will not become too damp.

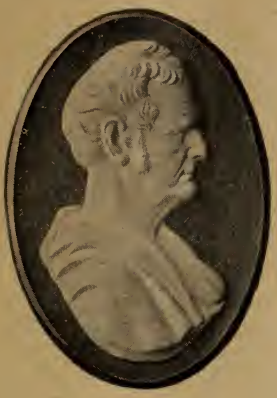
3. After the treatment the pile of oats should be covered for at least five hours.

4. Treated oats must not be sacked for any length of time unless they have first been thoroughly aired for at least twenty-four hours.

FIFTY REGISTER FOR FRUIT MEN'S COURSE.

Fifty of Indiana's leading fruit growers registered for the fourth annual fruit growers' short course which began at Purdue, Monday, February 7. Prof. Laurenz Greene, head of the department, outlined the purpose of the course as a start of the program.

The course consisted of lectures by Professor Roberts of Wisconsin University, and Professor Greene and Mr. C. L. Burkholder, on pruning and fertilizing, the establishment and upkeep of orchards.



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YOU are learning in school what every progressive farmer of today knows—that success in farming depends to a great extent upon the machinery used in the various operations.

Good farm machinery enables the user to make the most of conditions as they come—insures better and more timely work, cuts the cost of production—results in greater yields and greater profits per acre.

There is a John Deere implement for practically every farm operation. They are designed to meet successfully your different soil requirements. There is built into every John Deere tool that quality and long life which make every one of them a profitable investment.

When you start farming, start right. A good start—with John Deere tools—is half the battle.

JOHN DEERE, MOLINE, ILLINOIS

JOHN DEERE
MOLINE, ILL.
THE TRADE MARK OF QUALITY
MADE FAMOUS BY GOOD IMPLEMENTS

An Opportunity

The Dairyman today faces an unprecedented opportunity to market nutritious palatable milk products at a substantial and continued profit provided he carefully guards his operation costs, and protects his product from those preventable losses of quality which so often greatly reduce the margin of his profits.

The exceptional cleaning qualities of

Wyandotte Dairyman's Cleaner and Cleanser

are recognized by the agricultural colleges of the United States and Canada as being peculiarly adapted to this need of the dairy industry, and for eighteen years this cleanser has guarded the delicate qualities of sensitive milk products, thus saving a substantial margin of profit for the careful dairyman.

An order on your supply house will convince you of the truth of these claims.

It cleans clean.

Indian in circle in every package

THE J. B. FORD CO.,
Sole Mnfrs., Wyandotte, Mich.

CONTAGIOUS ABORTION DISEASE.

(Continued from page 261)

Animal Industry and many of the state agricultural experiment stations have exploited many of the medicinal agents advertised and prescribed and found them wanting in merit.

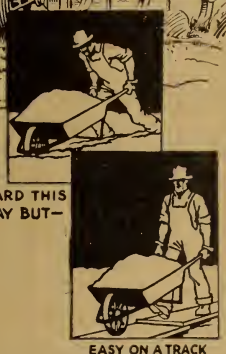
When we consider that only about 50 per cent of the animals that abort the first time will abort the second time, and from 3 to 7 per cent of those that abort the second time will abort the third time, and seldom if ever does an animal abort the fourth time, it is easy to understand why many of the remedies have been given undue credit for their supposed curative properties.

The owner of an infected herd can not expect an early eradication of the disease, or to establish immunity in individuals that have aborted and at the same time prevent sterility, without the aid of outside professional services, and a thorough application of disinfecting agents and a rational use of mild antiseptic measures.

If a cow aborts and the placental membrane is retained for more than twenty-four hours a reliable and competent veterinarian should be called, who should be allowed to exercise his judgment as to just when the afterbirth should be taken.

All debris, soiled bedding and the dead foetus should be collected in a water tight container, taken out of the stable and burned at once. The floor, gutters, and all remaining discharges should be disinfected by spraying with one part of compound liquor cresol in thirty parts of water. After the placenta has been removed and the uterus irrigated with a mild antiseptic the cow, if she is not already isolated from the balance of the herd, should be removed to suitable quarters some distance from the other cattle, not necessarily from the stable as she must not be neglected. Daily irrigation of the vagina and uterus with mild and suitable antiseptic agents should be kept up until all vaginal discharges cease. The external genital organs, tail and adjacent parts should be washed at the same time with an antiseptic solution. Agents that allay irritation and arrest inflammation of the uterus and vagina have much to do with preventing sterility. Strong medicine, insufficiently diluted, when applied to an already irritated and inflamed surface do great harm.

The War Taught Us A Tractor Lesson



WHEN power is needed over soft, wet or rough ground—on the battlefield or on the farm—only the tank-type tractor can "deliver the goods."

The Allied Armies learned that lesson well in France and tens of thousands of farmers the world over have taken it to heart.

Take early Spring plowing or discing, Cletrac's two broad tank-type tracks get a firm grip on footing where ordinary tractors would "mire in." Cletrac goes right ahead and gets the plowing or discing done while the ground is almost too soft for horses.

And in the hot, horse-killing haying and harvest days the Cletrac user can push his tractor to the limit—twenty-four hours a day if necessary.

The interesting booklet, *"Selecting Your Tractor,"* 32 pages of practical information on power farming that will assist you in your agricultural studies. A copy is yours for the asking.

SPECIFICATIONS

Horsepower: 12 at Drawbar, 20 at belt-pulley

Length: 96 inches

Width: 50 inches

Height: 52 inches

Weight: 3420 pounds

Turning Circle: 12 feet

Traction Surface: about 800 square inches

Center to Center of Tracks: 38 inches

Belt Pulley: Diameter 8 inches, face 6 inches

THE CLEVELAND TRACTOR CO.

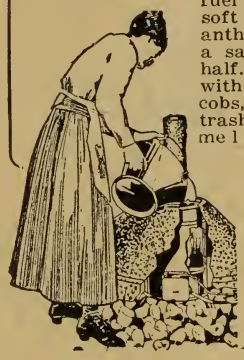
"Largest Producers of Tank-Type Tractors in the World"

19123 Euclid Avenue **Cleveland, Ohio**

Cletrac *TANK-TYPE TRACTOR*

BOWERS BROODER STOVES

Don't let hard coal shortage rob you of the benefits of a Brooder stove. Get a Bowers **Air-tight, All-fuel** Brooder stove and burn any kind of fuel you like. Burns soft coal as well as anthracite, and at a saving of nearly half. Works fine with stove wood, cobs, chips, chunks, trash. The soft, mellow, constant heat saves your chicks and makes them grow.



F. M. Bowers & Sons Co.
1101 West Wash. St., Indianapolis, Indiana

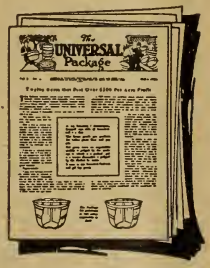
CORRECT METHODS OF INCUBATION PAY.

(Continued from page 264)

and ease of operation; its methods of heating, ventilation and regulation. It doesn't pay to buy a cheap, poorly constructed machine, nor does it pay to buy a small machine when there is a possibility that a larger one may be used. There may come a time when there will be a desire for enlargement and in that event the larger incubator can be operated just as economically as the smaller ones. An incubator of 150 to 200 egg capacity is a good size for the average farm.

In locating the incubator consider the room from the standpoint of accessibility, ventilation, freedom from drafts, and sudden changes of temperature. A cellar is the best place if it is well ventilated and dry, as it is the place least likely to change in temperature.

In the actual operation follow the manufacturers' direction as he knows his machine. To start with it is often best to run the incubator empty for a few days to secure a regulated temperature. Then put in



Send 25c in stamps or coin for sample Universal Package.

Fruit and Vegetable Growers

Need These New Ideas

Keep yourself posted on new methods by reading this monthly bulletin. Contains advice on spraying, planting, market data, suggestions for shipping and storing, etc. Illustrated. Mailed without obligation or charge to any grower or shipper. Send your name for our mailing list TODAY.

Package Sales Corporation

112 E. JEFFERSON ST. SOUTH BEND, IND.

BURPEE'S VEGETABLE SEEDS

25 Full Size Packets for $1.00

To help reduce the high cost of living, we have prepared this special **Bargain Collection** of vegetable seeds.

A dollar spent now for Burpee's Seeds will produce vegetables that will help greatly to reduce the high cost of living. You can save a great deal of money by growing your own vegetables.

The Burpee Bargain Collection contains twenty-five regular large size packets of Vegetable Seeds of the highest Burpee Quality. One packet each of the following:

Sweet Corn, Evergreen	$.10	**Musk Melon,** Emerald Gem	$.10
Burpee's Golden Bantam	.15	**Watermelon,** Halbert Honey	.10
Country Gentleman	.15	**Onions,** Yellow Globe	.10
Beans, Stringless Green Pod	.15	Burpee's Australian Brown	.10
Burpee's Saddleback Wax	.10	**Parsnip,** Offenham Market	.10
Beets, Burpee's Columbia	.10	**Pea,** Burpee's Profusion	.15
Detroit Dark Red	.05	**Radish,** White Icicle	.10
Cabbage, Enkhuizen Glory	.10	Burpee's Scarlet Button	.10
Carrot, Chantenay	.05	**Tomato,** Spark's Earliana	.10
Lettuce, Burpee's Wayahead	.10	Burpee's Matchless	.15
Burpee's Brittle Ice	.10	**Turnip,** White Egg	.10
Spinach, Burpee's Victoria	.10	**Rutabaga,** Purple Top Yellow	.05
Cucumber, White Spine	.10	Total value $2.60	

If purchased separately this seed would cost $2.60.

The complete **Bargain Collection** will be mailed to your door postpaid for **$1.00.** Send today a dollar bill. **Burpee's Bargain Collection** will come to your door by return mail.

W. ATLEE BURPEE CO., Seed Growers, Philadelphia

The agricultural colleges today in their Animal Husbandry Departments set the pace for the Live Stock Producers and Feeders.

Alexander, Conover & Martin

buy the feeding and experiment cattle for Indiana and Illinois Universities and we sell the fat and experiment cattle for Illinois, Indiana, Missouri and Ohio Universities.

These great State Universities have experimented and proved for you that the salesmanship and service of Alexander, Conover & Martin, is a fitting crown to your efforts to make the most money out of your Live Stock.

Consider well this important fact and let us handle your next shipment.

Alexander, Conover & Martin

CHICAGO KANSAS CITY ST. LOUIS

A Wonderful New Product Takes the Place of the Smoke House on the Farms

Instead of smoking your hams, sausages and meats, paint them with a smoke in liquid form. Gives meat a delicious flavor, that can not be obtained in any other manner; makes it wholesome and exceedingly appetizing.

"Old Gibraltar Concentrated Smoke"

Two coats of Concentrated Smoke, ten days apart, is generally sufficient. Your meats cured in this manner will be even more delicious than if the Old Smoke House was used. You can save yourself a world of time, and make your meats ready to market, ready to use, with scarcely an effort. **"Old Gibraltar Concentrated Smoke"** is put up in **Quart Bottles—75 cents—Brush for applying Free.** Your nearest druggist can supply you, or write

KIEFER-STEWART CO.
Est. 1840 Indianapolis, Ind.

FOREMOST AMONG BETTER GRINDERS

Crush and grind all the grains that grow. Fine for hogs or moderately coarse for cattle feeding.

Strength, durability and service radiate from every line of these powerful mills. Simple but effective in adjustment. A strictly high grade piece of machinery for the farmer or miller.

Light Running—Long Life—Extra Capacity Cone-Shaped Grinders

It pays well to investigate.
10 sizes: 2 to 25 H. P. or more.
Write today for FREE catalog.

THE C. P. BOWSHER CO.,
South Bend, Ind.

the eggs. From then on it is a question of regular attention to the schedule of operation and constant care. On the second day start turning the eggs twice daily by shuffling with the hands. This turning should be done each time before attention is paid to the lamp, as there is danger of getting coal oil on the eggs. On the seventh day test for infertile eggs. From then on till the eighteenth day the eggs should be left out of the machine each day till cool to the touch. The temperature in the incubator must be maintained at from 102 to 103 degrees, though a slightly higher temperature may be allowed near the end of the hatch. The eggs should be candled again on the fourteenth day to eliminate those eggs containing dead germs.

On the eighteenth close the incubator and darken the front by hanging a cloth over the door. Leave it thus till the chicks are hatched, though care must be taken to keep the temperature normal. The chicks may be removed to the brooder in a flannel lined box about thirty-six hours after hatching. If moved before that time there is danger of chilling.

With carefully selected eggs from vigorous stock, proper care for these eggs previous to setting, and proper attention during the period of incubation, whether natural or artificial incubation is used, a larger percentage of strong, vigorous chicks will be secured, which with the proper methods of rearing should develop into strong, vigorous chicks. Careful attention to details at all times during the hatch is absolutely necessary.

INDIANA FEDERATION OF FARMERS' ASSOCIATIONS.

(Continued from page 256)

only deal with state problems, but must uphold the national organization in its struggle with national questions.

The present executive officers have tried to follow progressive, and at the same time sound policies. Any action that gives promise of leading to permanent results must be well considered and carefully thought out. Ill-advised or hasty action, especially in this time of readjustment, when minds tend to thoughts of selfish class interests on the part of many, may lead to a reaction and destroy the usefulness of the farmers' organization."

"Before installing the Perfection I examined all the different makes of milkers, and finally decided on the Perfection Milker because it has the most natural action of any machine I have ever seen." —Geo. Henton.

Milk Your Cows Nature's Way.

WHY not milk your cows Nature's Way? The calf is Nature's Way of milking. It is impossible for human hands to imitate the calf's action. What human hands fail to accomplish has been reproduced to the last detail in the action of the Perfection Milker. That's why you milk Nature's Way when you milk with the Perfection.

The calf milks with a gentle suction followed by a *downward squeeze* between the roof of the mouth and the tongue and then a moment of rest while swallowing. Put your finger in the teat cup of the Perfection and you find the same action. In no other milker will you find that downward squeeze.

Perfection owners say their cows stand quietly for this natural way of milking and give more milk.

Milk Nature's Way and save yourself time and drudgery.. You can milk 24 to 30 cows in an hour with the Perfection. Here's enough saving in wages of hired help to pay for the Perfection in less than a year.

Find Out More About Nature's Way

Send for a copy of the book, "What the Dairyman Wants to Know." It explains in detail this better way of milking. We'll send names and addresses of Perfection owners near you. Why Milk by Hand? Perfection milks Nature's Way.

Perfection Manufacturing Company

426 South Clinton St.
Syracuse, New York

2146 E. Hennepin Ave.
Minneapolis, Minnesota

PERFECTION MILKER

SELLING INDIANA APPLES.

(Continued from page 254)

Honesty is absolutely necessary in order that the merchants will continue to patronize the grower. Selling at the orchard in competition with the grocery trade is objectionable, although a limited amount during the picking season does not generally affect the grocerymen very much.

A fourth and very much more difficult trade to build up is to pack strictly fancy fruit for which a premium is charged and which is sold directly to the consumer on orders which may be booked at any time during the season. Deliveries are made at any time, by truck, express, or freight. This special trade is hard to develop, but is invaluable when once established. Honesty, perseverance, and advertising is more essential in the last method, although to the extent that these things enter in, will any of these selling methods be successful.

When planning the spring work do not neglect the house and yard. A couple of rambler roses or Virginia creepers planted by the porch will add immeasurably to the looks of the place and to its comfort, too, when they get large enough to produce a little shade. Unsightly buildings or objectionable views may easily be screened by planting a few tall growing shrubs, such as the syringa, Spirea Van Houtte, or the old-fashioned snowball.

Spring is almost here. Be sure to have warm, dry, comfortable farrowing quarters for the sows.

SHEPHERDS OF INDIANA.

(Continued from page 252)

When feeders in this state can buy lambs that have passed through four commissions, and still make money they must know something about the feeding business. When breeders in the state can put on a state show of 800 mutton breeding sheep there must be some factors that create that interest. When the grand champion wether at the International is won five consecutive times by Indiana's foremost sheep breeder, surely problems in the sheep business must cease to be problems without a solution.

"MADE IN INDIANA"

Kingan's Digester Tankage

(HOG FOOD)

Manufactured in accordance with the Indiana Feeding Stuffs Control Law—Guaranteed to contain not less than 60% Protein, 6% Fat. Is recognized as one of the leading brands on the market and a very profitable article when fed at any season throughout the year. A trial will convince you of its merits.

Insist on obtaining "KINGAN'S" Digester Tankage of your dealer.

KINGAN & CO. LTD.

BEEF AND PORK PACKERS,
INDIANAPOLIS, IND.

Skilful Feeding

is the secret of maximum milk yield

Feeding cows a generous balanced ration of palatable feed containing the right proportions of protein, carbohydrates and fat will insure a full yield of rich milk. The difference between profit and loss in dairying is mainly a matter of **feed.**

ACME Dairy Feed

is a balanced ration. The experience of many years goes into its making. Every ounce of it is pure and wholesome. It contains no cheap fillers and no waste.

Acme Dairy Feed produces results. It is palatable—the cows like it—and it contains the exact proportions of health-giving milk producing elements necessary to secure a maximum yield of milk.

Acme Dairy Feed is used by thousands of the leading dairymen of the country and has stood the test of many years.

Ask your dealer for ACME Feeds

Make every cow a 100% producer by using the palatable balanced ration—Acme Dairy Feed.

There is an Acme Feed for every animal.

ACME Hog Feed
ACME Scratch Feed
ACME Stock Feed
ACME Horse and Mule Feed
ACME Farm Feed
ACME Barleycorn Feed
Alfalfa Molasses Grain Feed for Horses

ACME-EVANS CO.

INDIANA'S LARGEST MILLERS

INDIANAPOLIS - - INDIANA

ORDER FROM

Mid-West Crushed Stone Quarries Co.

AGRICULTURAL LIMESTONE

SOIL SWEETENER ACID REMOVER

THE FARMER'S BEST FRIEND

Our Price is Right
Our Product is Right

Our Shipments are Right
Box and Open Top Cars

—QUARRIES—
Greencastle, Indiana. Ridgeville, Indiana.
General Office—Indianapolis, Ind.
A. B. MEYER, President.

Boost Your State and Help Purdue

E. RAUH & SONS FERTILIZER CO.

Union Stock Yards
INDIANAPOLIS, INDIANA

Manufacturers of

HIGH GRADE MIXED FERTILIZERS
ACID PHOSPHATE
Digester Tankage for Hogs
Meat Scraps for Poultry

Importers of

Nitrate of Soda **Sulphate of Ammonia**
Potash Salts all Grades

AGENTS WANTED IN UNOCCUPIED TERRITORY.
We Solicit Your Patronage.

Indianapolis Cordage Co.

Indianapolis, Indiana

Manufacturers of

HIGH GRADE BINDER TWINE

Our product guaranteed in all respects the same as other High Grade Twine.

Treated to Withstand Insects

Indianapolis Cordage Co.

Indianapolis, Indiana

Office and Mill

1959 South Meridian St.

COLLEGE FOOTWEAR
OF ALL DESCRIPTIONS
FOR ALL OCCASIONS
—FOR—
CO-EDS, STUDENTS AND FACULTY
The Varsity Boot Shop
302 State St., West LaFayette

Have Her Picture Framed
at
The Foster Shop
Opposite the Campus

SOUTHWORTH & TOBIAS CO.
STUDENTS NOTICE!
Headquarters for
Hart Schaffner & Marx Suits
and Overcoats
High Grade Furnishings

When you think of
ATHLETIC GOODS
think of
DEAC

ANYTHING A STUDENT NEEDS
GABLER'S BOOK STORE
STRAND THEATRE BUILDING

We Are Never Too Busy
to do YOUR
SHOE REPAIRING
Come in! We'll give you—
A QUALITY JOB
BOSSUNG
in rear of Varsity Shoe Store

Do You Advertise in The Purdue Agriculturist

U Ag. Sem.

The PURDUE AGRICULTURIST

UNIVERSITY OF ILLINOIS
APR

Champion Percheron Stallion Imprecation

APRIL, 1921

Vol. 15 No. 7

How does she make that extra 10 lbs.?

MOST grass is deficient in protein, and calcium. The stomachs of an average cow can't hold enough grass to supply the elements needed for more than about 20 pounds of milk. Yet she may produce 30 pounds for a time because she is stimulated by the new grass and probably a new calf. She does this by drawing upon the tissues of her body for the protein and minerals needed for the extra 10 pounds.

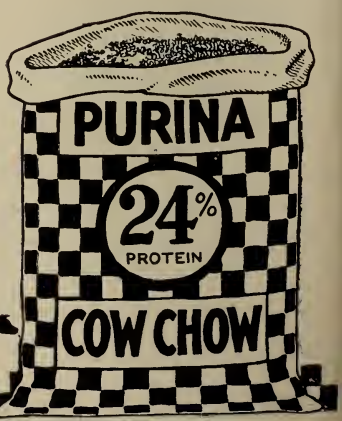
Don't Let Cows "run down"

Get that extra milk right along. By feeding the elements that grass lacks, you will get it. You will also stop the drain on your cows' systems.

Feed Purina Cow Chow NOW!

Purina Cow Chow supplies all that grass lacks. It makes your cows go through the season with better milk records—on an average, 3 lbs. of extra milk per day for every pound of Cow Chow fed. It will leave your cows in fine shape in the fall, ready to start right off with a good winter milk production. See the nearest Purina Dealer. Write for "ABC's of Milk Making," free.

Feed from the Checkerboard Bag



RALSTON PURINA CO.

ST. LOUIS, MO.

Ft. Worth, Texas Nashville, Tenn. Buffalo, N. Y.

SERVICE TO YOU

AT the touch of a button innumerable services are performed for man's personal comfort and convenience. Communities are made brighter and safer by night. Transportation is swifter, surer, economically better. Industrial machinery everywhere is energized to produce the world's goods with far greater speed, simplicity and economy.

But bending electricity to man's will would be futile without the electric light and power companies. Through them, men benefit by a Research which has made incandescent lamps four times better, power transmission easier now over hundreds of miles than it was then for ten miles, and generating machinery capable of producing a hundred times as much power in a given space.

It is through the investment of capital in electric light and power companies that electricity can be generated on a vast scale for economy's sake. It is their capital, their engineering and maintenance service, their business organization which distribute current through constantly multiplying millions of wires. These companies are vital to the world's use of electricity.

In order that they may deliver to you at the end of a wire the fullest benefit of Research, they need the sympathetic interest of a consuming public which views fair-mindedly the operating and financing problems of this service.

95-420 I

GENERAL ELECTRIC COMPANY

READ AND PROFIT BY THIS ADVICE Mr. DAIRYMAN

Mr. J. M. Hackney, owner and developer of several World's Champion cows, three of which are shown on this page, has proven the *importance of feeding a ration which will furnish cows adequate maintenance, without which no cow can produce maximum flow.*

Mr. Hackney has found out by experience that too much protein is injurious—that to secure maximum milk production cows must be kept at top-notch physical condition—the ration must be a health builder, strength and vitality giver. That's why Mr. Hackney likes his cows to have

SCHUMACHER FEED AND BIG "Q" DAIRY RATION

ARDEN FARMS
J. M. Hackney, Owner

St. Paul, Minnesota
The Quaker Oats Co. January Third, 1920

Gentlemen—I must say to you frankly that in my letter to you concerning feeding of Holstein Friesian Cows on my Arden Farms, I overlooked the most important factor, which I wished to bring out. I do not believe in a high protein ration. After the experience I have had, it is my judgment that breeders do not place enough importance upon the maintenance part of the ration of a cow. To secure a maximum yearly production means that a cow must be kept in good physical condition, nothing must be done to tear down the structure. It is my judgment that too much protein is injurious. There is good chance for argument as to just how much protein a cow should have, but I do not wish to engage in a discussion of the fine points, but I believe that a small amount of protein is better than too much, if one expects to have cows go on year after year and maintain their good health and produce their maximum of butter and milk. We mix most of our feed ourselves with the exception of SCHUMACHER FEED and BIG "Q" DAIRY RATION, with which we have been very successful.

Yours very sincerely,
(Signed) J. M. HACKNEY.

Owners of cows holding world's records, as well as owners of grade cows, alike endorse the merits of SCHUMACHER FEED, the great maintenance ration. 36 World's Champion Cows have been helped to make their world's records with SCHUMACHER as a part of their maintenance ration.

BIG "Q" DAIRY RATION is a *Quality* protein ration—when fed in conjunction with SCHUMACHER it supplies just the right amount of protein to stimulate milk production without "burning out" or tearing down the cows' physical condition.

The ideal SCHUMACHER BIG "Q" combination will keep your cows "going strong" month after month, and it's the cow that maintains maximum production over long milking periods that is the profit-producer. Feed dealers everywhere can supply you with these big result-producing feeds. Give them a trial. The best time to start is NOW.

The Quaker Oats Company
Address: Chicago, U. S. A.

Beauty Boots Walker Segis
World's Champion Sr. 2-Yr.-Old Holstein. In 365 days produced 1040.64 lbs. Butter, 25345. 20 lbs. Milk. This heifer broke 20 world's records.
Jewel Pontiac Segis
World's Champion Sr.—3-Year-Old Holstein—In 365 days produced 1171.16 lbs. Butter, 27068.5 lbs. Milk.
Beauty Girl Pontiac Segis
of Arden Farms Inc.
World's Champion Jr. 3-Year-Old Holstein-Friesian. At age of 3 yrs. 2 months, 7 days produced 1112.91 lbs. Butter, 24924.70 lbs. Milk.

(D-2)

Properly Located Belt Pulley

THE Belt pulley of a tractor is just as important as the draw bar. On Case tractors you find it in the only logical place for it.

The Case Belt Pulley with clutch is mounted on the right side, directly on the crank shaft, which is the proper place. Being parallel with the length of the tractor, it takes only a moment to throw the belt over the pulley and back into it. The pulley is on the same side of the tractor as the steering wheel. This gives the operator an unobstructed view along the belt to the driven machine so that he can "line up" perfectly in the least amount of time. The pulley is so placed that the belt does not rub against any part of the tractor. Liberal pulley diameter and face insures ample contact surface for the belt. Belt slippage is reduced to a minimum.

An arm, supported by the main frame, carries an adjustable bearing outside of pulley—a firm support for the end of the crank shaft. This additional bearing prevents excessive wear of crank shaft bearing next to the pulley. *An outer pulley bearing on a tractor is highly important.*

J. I. Case Threshing Machine Company

Dept. D310 - - Racine, - - Wisconsin

CASE·ON TOP SINCE 1842

CASE

TRADE MARKS REG. U.S. PAT. OFF. AND IN FOREIGN COUNTRIES.

KEROSENE TRACTORS

This is No. 4 of a series of treatises covering tractor design and construction. Keep a complete file for future reference. Students interested in tractor engineering are invited to visit the Case factories at Racine, Wis., or visit one of our nearby Branch Houses to learn important details of tractor construction.

The Secret of Making Your Dairy Pay

Help Your Cows Increase Your Profits

EVERY dairyman knows he can't make a profit on milk unless he *feeds* for it.

And unless he weighs his feed and weighs the milk from each cow he can't know the profit he makes.

Buffalo Corn Gluten Feed will greatly increase your milk yield.

Buffalo Corn Gluten Feed contains concentrated corn protein in a highly digestible form. It is used by successful dairymen all over the country.

Get a supply of Buffalo Corn Gluten Feed. Mix three parts of Buffalo Corn Gluten Feed with one part of wheat bran, or one part of ground oats and one part beet pulp.

You can mix a whole ton in a half hour—the most profitable half hour you ever spent.

Feed this mixture one pound to every three and one-half pounds of milk and see how your milk yield will jump.

After a month's trial of Buffalo Corn Gluten Feed you'll never again go back to the old methods of feeding.

FREE—Write for full information giving the correct mixture for feeding Buffalo Corn Gluten Feed. If your dealer cannot supply you with Buffalo Corn Gluten Feed, tell us who and where he is. Write today to Corn Products Refining Company, Feed Department, 17 Battery Place, New York.

Corn Products Refining Co.

New York **Chicago**

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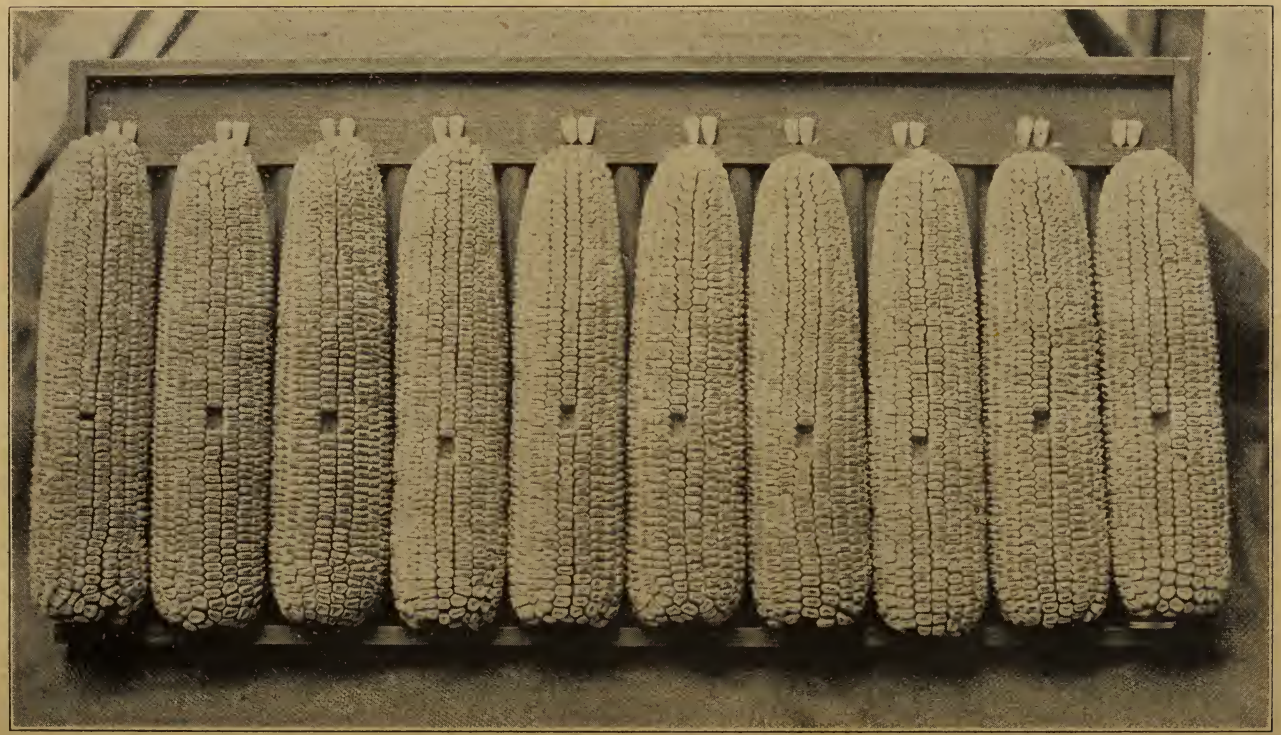
Entered as second class mail matter December 4, 1906, at the Post Office, LaFayette, Ind., under the Act of Congress of March 3, 1879.

Subscription Price One Dollar Per Year. **Advertising rates sent on application.**



An exhibit worth studying. The grand champion ten ear exhibit at the International Hay and Grain Show. Grown and exhibited by C. E. Troyer, of LaFontaine, Ind.

The Purdue Agriculturist

VOLUME XIV APRIL, 1921 NUMBER 7

The Return of the Horse

By Ellis McFarland,
Secretary Percheron Society of America.

THE whole agricultural and industrial world is returning to the draft horse. This one clear call is so distinct that there can be no mistake as to its true meaning. For the last few years money came so easily that people cared little as to how rapidly it was spent. For that reason farmers and city transfer men purchased tractors and trucks with little thought as to whether it was an economical purchase. They never once stopped to figure out whether the draft horse could do their work cheaper than mechanical power. That was not the question. For many, it was merely because it was the fashion to ride a tractor or a truck. In all fairness to both sides of the question, let it be said that during these abnormal times there were certain jobs that were done well by tractors and trucks. The trouble was that altogether too many people tried to make use of mechanical power when only a few had work suitable to tractor and truck use. In typical American fashion we all went pell-mell in one direction. Today, the majority have faced about and are now praising the draft horse just as strongly as they did the tractor and truck only a few months ago.

Read what a noted horse authority says about the outlook for good horses. Then resolve to breed all your farm mares to the best available draft stallion and to give the resulting progeny the best feed and care possible.

Next Month: "The Ideal Farm Home," by Mrs. Chas. W. Sewell.

The cause of this complete and very rapid change in the minds of people is very easily understood. We are getting back to normal times. Most farm products are not worth half what they were six months ago. It is extremely difficult to borrow money. Unfavorable financial conditions are causing a great set back in the industrial world. Truck and tractor factories are closing down because they cannot sell their product. Farmers are holding on to their 1920 crop with the hope that prices will improve. They see little chance of breaking even because it cost a great deal more to produce last year's crop than it would bring at present valuations. Therefore, everyone, whether rich or poor, whether farmer or city business man, must cut down on expenses. And it does not take a banker or an expert accountant to figure out that at present prices of grain, hay and gasoline a draft horse will do one's work cheaper than will any truck or tractor.

We are now living in a day when the word "Economy" will be overworked. When the thinking farmer comes to consider which breed of draft horses is the best and most economical to raise, he is going to choose Percherons. Some, of course, might make a mistake on this point, but the majority will not. First, one should select the breed that will be ready for the harness in the shortest time possible. In the corn belt states one does not have to look very hard to find two-year-old Percherons in the collar. The wide, deep middle and gentle disposition of the Percheron is proof positive of his early maturity and easy keeping qualities. Second, the Percheron horse has a foot that beats them all from the standpoint of wearing qualities. Third, the Percheron horse is free from hairy legs. A farmer does not have to spend any time keeping the legs of his Percherons dry and clean. The war proved that the Percheron horse suffered no ill effects from standing many days in mud up to its knees. This particular feature is a big item to the farmer who is short of

help and who needs to spend all of his energy in doing something that will result in an earning of dollars and cents. Fourth, disposition counts a long way in a valuable farm horse. The Percheron has no equal in this respect. Any Percheron colt that is halter broken can be put to work without the slightest annoyance to the driver. They are so sensible that they work the first time as though they had been worked every day for a year. A farmer should think of this matter of disposition in his horses very seriously when he is selecting a breed. If he has young boys of his own, or hired men who, as a rule are not the most careful drivers, a Percheron team is a great satisfaction to the owner. The fact that they are not easily excited makes up many times for the lack of judgment of the driver.

The ability to stand the heat is undoubtedly the principal quality which has made so many friends for the Percheron horse. There is no other breed so popular in sections affected by extreme heat. In selecting a big horse there is no one thing of greater importance than this matter of getting an animal that can do a full day's work in harvest time. Then, too, this same quality comes up again for consideration where one must rely upon incompetent drivers. The owner is not always able to look after his teams personally.

Wolfington, the Champion American Bred Stallion at the 1920 International at Chicago, was sired by the $40,000 Carnot.

The Percheron horse has never had such a bright future since its introduction into the United States over 60 years ago. In fact there is every indication now that since Percherons are the horse of the hour, farmers who breed this kind of draft horse will have a product for which there will be an unlimited market at extra good prices.

Purdue Downs Northwestern in Track.

Purdue won her second track victory in as many starts on Saturday, March 12, when she downed Northwestern 54-32. The Purdue thinly clads placed in every event and captured six out of ten firsts. Some unusually good showings were made, and it is fairly certain that Purdue will give a good account of herself in the Conference meet.

Purdue Swimmers Beat Indiana.

Purdue's swimming team, led by Captain Hamilton, easily downed Indiana's pool artists 48-20 in a recent meet. Most of Purdue's points were garnered in the diving and back stroke events, although they placed high in almost every event. Captain Hamilton, Roberts and Stoever were Purdue's mainstays and heavy point getters.

Twenty Rows of Kernels to Ear

Mr. C. E. Troyer, of Lafontaine, tells how he grows prize winning corn.

MY success at the recent international really dates back to a "Corn Talk" given by Prof. G. I. Christie at a farmers' institute held at Wabash, Ind., about twelve years ago. The inspiration received from Professor Christie's talk caused me to dream a dream about better corn than the world had ever seen. Since that time my life has been dedicated very largely to the consummation of this dream.

Several years ago I learned that the ear that was weak in seed condition was always a poor producer. I also insist that each ear shall have twenty rows of kernels. Next to the seed factor the fertility in the soil and cultivation of the crop are of equal importance.—C. E. Troyer.

My entry of corn at the first State corn show that I attended was outside the money. To a man who liked to be at the top, there were two courses open. I must either improve a great deal the strain of corn I was using or buy seed from someone who already had a better strain. I chose the latter course, buying a bushel of seed from L. B. Clore, of Johnson county, who was "Corn King" at that time. As I live 100 miles north of Johnson county, I naturally expected this corn to be adapted to a little longer growing season than was possessed by our locality. This proved to be true, but by breeding and selection for earlier maturity the corn rapidly became adapted to my season, having become about two weeks earlier in the ten years that I have raised it.

Breeding Increases Yield.

The first year that I raised Johnson County White my yield was increased about 25 bushels to the acre over that of the other corn raised in this locality. Since that time I have been breeding this variety by the ear-to-row method and have increased its yielding ability another 25 bushels per acre. This year, with a season that wasn't favorable to the production of a high yield, my yield was 109 bushels per acre, while Homer Crandall, of Henry county, produced 147.27 bushels per acre with seed purchased last spring of this same strain that won the championship at the International. Many of my seed corn customers have official yields ranging from 100 to 128 bushels per acre.

My hobby has always been the most useful ear, rather than the prettiest ear. In fact, the ear looks prettiest to me that gives the greatest promise of being a good producer. In my ear-to-row plots I have always found the type of ears that I show to be the best producers. Several years ago I learned from these plots that the ear that was weak in seed condition was always a poor producer, also the poorly matured ear, even if it would grow, was in the same class. Having selected for a number of years those ears for seed that have a well matured kernel, free from starchiness, and with a square shoulder next the cob, I find it much easier to find that type of ear now than formerly. I also insist that each ear that I plant shall have twenty rows of kernels. This has helped to fix the number of rows so that a larger proportion of the ears will have that number. It is impossible to find enough ears that are just right in all proportions to plant an entire crop. In using the Indiana score card for guide, I often plant ears that are a little rougher in indentation than the ideal. I also plant some ears that would get cut severely on length, providing they have my ideal type of kernel. These smaller ears with a great deal of quality nearly always prove to be splendid producers.

Factors That Increase Fertility.

Next in importance to the seed factor, which I consider to be the most important, I would say that the fertility in the soil and the cultivation of the crop are of equal importance. The field that produced the champion ten ears is in the Mississinewa river bottoms. This is the only World's Champion sample that was ever produced on this type of soil. This soil is very sandy and is covered by the water from the river during very high floods. Many farmers plant corn on this type of soil every year and get a fair yield of 50 to 75 bushels per acre. I prefer to rotate my crops, raising clover or

alfalfa every third or fourth year. I also feed the grain and hay raised to live stock and return the manure to the soil. I apply this manure to the young clover crop after cutting the wheat, thus helping the clover crop and causing the manure to be in a well rotted condition for the succeeding corn crop. I do not apply commercial fertilizer directly to the corn crop on this type of soil, but do use 200 pounds per acre of 16 per cent acid phosphate on the wheat crop, thus helping the clover crop that follows and indirectly the corn crop. I also mix some acid phosphate with the stable manure that is applied.

This type of soil needs to be worked a little differently from land that does not overflow. As the subsoil is also sandy it does not retain moisture as would land with a clay subsoil. To help conserve the moisture I break the ground from 8 to 10 inches deep. It pulverizes very easily and the spring-tooth or spike-tooth harrow is the only implement needed to get it in condition for planting. After the corn is planted I like to cultivate after each rain if possible. This year I cultivated the crop six times, the first four times with an ordinary riding cultivator and twice with a one-horse cultivator that passes between the rows. As the river washes in many weed seeds, it was necessary to hoe the 1920 crop twice to keep it free from weeds.

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C. E. Troyer, of LaFontaine, Ind., with the champion ten ears of the 1920 International. Snapped during the Purdue Short Course.

Counting Chickens After They're Hatched

By C. L. Manwaring.

SOME eight or nine years ago Mr. A. C. Manwaring, a merchant of Mentone, Indiana, while taking a trip through the west chanced to come upon a poultry farm situated near Denver, Colorado. The buildings were white and he remarked to his brother, "That looks like a little white city over there." Together they visited the farm, where, becoming enthused over the little fluffy chicks and the pretty white feathered red-combed hens, he returned to Indiana at once, sold his business, and began laying his plans for a poultry farm whose name should be the "White City."

C. L. Manwaring is the owner and successful manager of the biggest poultry farm in Indiana, and has developed as his market, a lucrative private trade in Chicago and elsewhere. How does he do it? Read his personal story.

His knowledge of poultry was "nil." As to how to feed a baby chick or care for a hen he knew absolutely nothing. His experience in the mercantile business and as a lawmaker in our state Senate and House gave him no information as to why chicks will die and hens won't lay. Notwithstanding his inexperience he was determined to develop an egg farm regardless of the fact that he was at an age when most men are thinking of retiring.

Beginning a Business.

One of his often used expressions was, "Any greenhorn can raise chickens." This expression, however, underwent considerable transformation as the months went by. He came to realize that it took a goodly supply of common sense and experience in order to make a poultry venture profitable on a large scale. Being gifted with an unusual amount of good judgment and an unconquerable ambition to make the venture succeed, he struggled along until his knowledge of poultry gained in the expensive school of experience began to give better results. At about this time his son, C. L. Manwaring, was taken into the business as a partner. Together they have developed the White City to its present proportions—the largest and best equipped farm in the state of Indiana. Mr. A. C. Manwaring died some few months ago, but the son, C. L. Manwaring, is continuing the business on the same square dealing policy and aims to strive to realize his father's ambition—that of making the "White City Egg Farm" one of the largest and most straightforward, "honest to goodness" value for your dollar egg farms in the U. S.

While the "White City" sells chicks and hatching eggs in the spring and pullets and breeding stock in the fall, yet the main purpose of their business is the production of high class table eggs. At present they have a private trade established that consumes the larger part of their output. Eggs are packed in dozen cartons, thirty dozens to the case, and are expressed in this manner to their trade. As a step toward gaining this private trade they advise packing eggs in a similar manner and supplying high class grocery stores in Chicago or some other city. Only the fancy eggs should be cartoned. Parcel-posting is not favorably considered by the White City.

High Average Production.

At the present time 3400 Single Comb White Leghorn layers are maintained, and plans are being made for caring for 5500-6000 the coming season. Of the 3400 layers, 2100 are pullets and 1300 are yearling breeders. The 1300 yearlings gave a flock average of nearly 150 eggs to the hen during their pullet year. Understand they don't claim a 200 or 300 egg strain, although without question there are a number of individuals in these two yearling houses that did, according to all tests, lay 200 eggs or better during their pullet year. No trap nests are used. During the first few years a 100 egg average was considered good. The increase to 150 has been brought about by culling and continually breeding from the best. Yearling hens exclusively are used as breeders and as a result the strain has not only

improved in egg production but also in size, being considerably larger than the average Leghorn.

Feeding the Producers.

The entire flock is under lights. The 2100 pullets have been lighted since last fall and the breeders have had their lights only recently. Two alarm clocks switch the lights on at 4 o'clock in the morning. At 6 o'clock a light feed of oats is given and the chill is taken from their drinking water. At noon about one gallon of oats to the 500 hens is scattered in the straw to induce exercise. About an hour before sundown six gallons of shelled corn and two gallons of oats are fed. To the hens under the lights fourteen to fifteen pounds of grain to the 100 hens forms the grain ration. The White City uses nothing but oats and corn as a scratch feed. A dry mash consisting of 150 pounds bran, 150 pounds middlings, 100 pounds fine corn meal, 100 pounds meat scrap and 4 pounds salt is kept before the hens at all times. No charcoal is used. Neither do they use any poultry tonics or "egg makers" of any kind. Good food, good breeding, and sanitation are the foundations of their egg production. Epsom salts is given occasionally. Hens to be used for breeding purposes are given free range the year through. Pullets are kept housed from fall until the following summer. Green cut alfalfa is provided to all the hens during the summer. During the winter it is cut into short lengths and fed in circular hoppers made from buggy tires and inch mesh netting. The top of this hopper is a colony brooder hover suspended from the ceiling. These hoppers are used only during the winter.

Equipment.

The brooding equipment consists of one long double continuous type of brooder and 10 colony brooders, giving them a chick brooding capacity of about 10,000 chicks. Various methods of feeding are used as they have not yet determined what the one best method is. Nevertheless, they consider buttermilk in some form, either liquid or powder, essential for the best results in rearing. The chicks have access to small runs of growing alfalfa and when this plays out, green cut alfalfa is provided. Pullets at the age of seven weeks are transferred from the continuous brooder to small colony houses situated on the same range as the colony brooders. This range is plowed and sown to alfalfa, rye, and rape every spring just as soon as the frost is out of the ground. The rye holds down the weeds and the alfalfa and rape furnishes green food during the summer. Up to the present the trough method of feeding on the range has been employed. From now on the hopper method will be used. They try to get the pullets transferred to the laying house before laying begins as they find that changing a laying pullet's quarters or radically changing her feed tends to produce pullet molt. They strive to keep their pullets in good fleshy condition at this time and feed more corn and fattening foods and less mash. Lights are then put on these pullets about November 1.

As to the proper type of laying house the White City strongly recommends the shed type, 16 feet wide and as long as you want it up to 150 feet, with the Purdue Experiment Station ideas as to windows, cloth curtains, etc.

Throughout the entire farm the principle of economy is employed. Corn and oats are bought direct from the farmers. Bran, middlings, meat scrap, and oyster shell are bought by the carload. No high priced prepared mashes are used. No money is spent on useless and impractical frills and fads.

The White City has been asked time and again, "Can I make money in the poultry business?" The answer is, "Yes." A person with ambition and pep, with a fair knowledge of the rudiments of poultry keeping and a willingness to work can make it go. But if you are a loafer or a changeable enthusiast you had better stay out.

Purdue Extension Bulletin No. 94, recently prepared by Professor O. F. Hall, contains a large number of games that do not require equipment which can be used on the school playground.

The losses occasioned by insects are largely profits. Care of the crop, including planting, cultivation, rent of ground or interest on investment, and sometimes even the harvesting are the same whether or not insect damage has occurred. What is gone is the 10-20-30 or more per cent taken by the insects. Prevent insect damage and save the profits.

WHY LIVE IN THE CITY?
MJC

Do Indiana Soils Need Fertilizer?

By G. P. Walker, '16,
Associate in Soils, Experiment Station.

AT the Rothamsted Experiment Station in England there is a plot of ground which has been growing wheat ever since 1852. It has averaged 36 bushels per acre and receives each year 1150 pounds of fertilizer.

At State College, Pennsylvania, on the experiment station farm, are four plots which have averaged 56 bushels of corn, 43½ bushels of oats, 25 bushels of wheat, and over 2 tons of hay for 35 years without manure, but with an average of 400 pounds of fertilizer each year.

At the Ohio Experiment Station farm three plots of ground have averaged 174 bushels of potatoes, 38½ bushels wheat, and over 2 tons clover hay for 25 years without manure, but with limestone and an average of 370 pounds fertilizer per year. The wheat on this land has averaged 39¾ bushels per acre for the last 12 years.

On the Scottsburg experiment field in Scott County, Indiana, there are three plots which have been growing corn, wheat and clover in rotation for 15 years. All the grain, hay, corn stalks and wheat straw have been removed from this land and an average of 150 pounds of fertilizer applied on each grain crop. The average yield of corn has been 38.8 bushels and of wheat 17.0 bushels per acre, while the untreated land has averaged 20.9 bushels of corn and 8.1 bushels of wheat. The 1920 crop of corn on the fertilized land yielded 66.0 bushels per acre.

Lime alone
30.3 bushels per acre.

Lime and Fertilizer
66.0 bushels per acre.

Corn on the Scotsburg experiment field 1920. Fertilizer has been used on this land and all crops removed since 1905. Last year was a good season and the fertilizer accumulated in the soil produced a fine crop.

There is no longer any doubt in the minds of most farmers that fertilizer rightly used is an important factor in increasing crop yields. The results of the experiments cited and many others of a similar nature are convincing proof of the truth of such a statement. However, not every fertilizer will produce a profitable crop increase on all soils. In fact, we have some soils in Indiana which are so well supplied with plant

food that no fertilizer will pay for itself in increased crops. We have been working with such a soil near Huntington on which neither manure nor fertilizer has produced any crop increase though applied every year for the last five years. Such soils are very rare, however, and not important.

Acid phosphate is now the best known and most widely used fertilizer in Indiana. On most of the soils of the state, phosphorus is the first need and is the limiting factor. Much of the dark colored prairie soil of Benton, Warren and Newton Counties and the hill land of south central Indiana, especially, show astonishing crop increases from the use of phosphate alone. However, there are considerable areas on which phosphate will not give good results until potash has been supplied. Experiments at Rensselaer on the dark sandy loam soils, found in Jasper, Pulaski, White and other counties in that section, and at New Point on the white "crawfish" or slash land found in Decatur, Jennings and neighboring counties during the past two years show the need of these soils for potash. At Rensselaer, phosphate alone produced 3.0 bushels of corn per acre, and with potash 26.2 bushels. At New Point, the average yield of corn has been 48.5 bushels per acre on the phosphated land and 61.1 bushels with the combination of phosphate and potash. On the cropped soils of these types and on the mucks of northern Indiana, potash must be applied if maximum yields and maximum profits are to be realized.

In deciding on the fertilizer to be used for grain crops on most of the land in Indiana, more attention should be given the system of farming and the treatment the soil has had in the past. On land where clover or other legumes have been grown and manure is applied regularly, phosphate alone will usually show the largest net profit. Where the crops have been removed and not much clover grown, potash or nitrogen may become the limiting factor and a mixed fertilizer pay a better net profit than acid phosphate alone. The data in the following table illustrate this point by showing the average crop yields since 1914 produced on two experiment fields by fertilizer, with and without manure using clover in the rotation, and with manure where timothy has been grown instead of clover. In this table L stands for limestone, M for manure, A P for 220 pounds acid phosphate on each corn crop, and N P K for 200 pounds of a 2-8-4 fertilizer on each wheat crop.

North Vernon.

Soil Treatment	Average Yields per acre		
	Corn, bu.	Wheat, bu.	Hay, lbs.
Untreated	49.9	9.6	2656
L A P N P K	52.0	23.5	3784
L M	74.8	19.5	3738
L M A P	79.1	21.4	3968
L M A P N P K	77.2	25.5	4252
L M A P N P K (Timothy in rotation)	69.6	20.8	2968

Worthington.

Untreated	34.8	9.5	2074
L A P	33.5	12.0	3652
L A P N P K	39.9	16.7	4336
L M	47.2	14.1	3934
L M A P	50.0	16.5	4384
L M A P N P K	50.6	21.8	4272
L M A P N P K (Timothy in rotation)	48.4	15.8	2162

Inspection of the Worthington results shows that without manure complete fertilizer applied to the wheat crop in addition to the phosphate on corn has increased the corn yield 6 bushels, wheat 4.7 bushels and hay 700 pounds per acre. On the manured and phosphated land the complete fertilizer has produced an increase of 5.3 bushels on the wheat crop, to which it was applied, but has had practically no effect on the corn and hay yields in the rotation. Similar results are shown on the manured land at North Vernon with a 4 bushel increase in the wheat yield for the complete fertilizer treatment. Where clover is grown and manure returned to the land complete fertilizer is often profitable on wheat, especially on sandy or silty loam soils which are low in organic matter. The nitrogen of the complete fertilizer stimulates a quick growth of the young plants and a good root growth is made before winter.

Further inspection of the results on both fields shows that the manured and phosphated land with clover in the rotation produced more corn and wheat and almost double the amount of hay that was produced by the land receiving the extra complete fertilizer with timothy in the rotation. Where clover is used in the rotation and the crops returned as manure, the straight phosphate fertilizer is to be recommended for corn on most Indiana soils as the clover crop increases the supply of nitrogen and the potash supply is sufficient in most cases. On dark colored silt loam soils the same is probably true with wheat.

Lime and acid Phosphate 17.7 bushels per acre. **Lime alone 9.3 bushels per acre.**

Wheat on the Scotsburg experiment field in 1918. Acid phosphate almost grew two bushels where one grew before

Low grade fertilizer should never be used, as it is expensive and is often made of material in which the plant food is not readily available for crops. The plant food in mixed fertilizer should total at least 14% and in acid phosphate 16%. On the lighter colored soils a little nitrogen and potash often produces a paying increase on wheat and such a fertilizer as a 2-12-2 may be used at a profit even where clover is grown and manure is used for corn. On the sandy and silty loams that have been cropped hard with little clover in the rotation and no residues or manure returned, a fertilizer containing more potash will give better results. For the dark sandy loams and muck soils such a formula as an 0-10-6 or an 0-10-8 is to be recommended.

April in the Garden

By T. J. Mellinger, '21.

THE busy season will soon be here. Then the more important things will be pushed as rapidly as possible, and many of the less important ones will be neglected. One of the really important things that is so often sadly neglected is the home garden. It affords more real pleasure and enjoyment to the family than any other part of the farm. The fresh vegetables come directly to the table and are not wilted and rotted as a result of rough shipping and long periods of standing on the open markets. Besides the fresh vegetables produced for the table there is the stock of root crops which are stored for winter use. A half acre will furnish the needs of one family, which if bought in the market would cost very nearly $200. Aside from this cash saving comes the great advantage of having them fresh, right at hand, and this cannot be measured in dollars and cents.

Now is the time to think about planting the seeds, and if the order has not been sent in to the seed company, it should be done immediately. Early orders are filled when the stock is plentiful, and the ones ordering late have to take what is left, or what

usually happens, the dealer tries to pass off some novelty or strain which is "just as good." If the seeds are received early they can be tested and if they do not germinate they can be sent back to the company to be replaced by good seeds before it is too late. But testing is usually not necessary where the seeds come from reliable firms.

As the manure is hauled out, the garden should come in for its full share. It should be applied at the rate of 20 to 30 tons to the acre, and should be put on as early in the season as possible. If the application is made in the fall it will be better, for the manure will then be washed and mixed down into the soil.

Potatoes should be planted the first part of this month, or better in the last week of March. Many growers plant on Good Friday or near that time. Tomato plants can be started in window boxes or put in larger pans or boxes in the kitchen and placed where the sunlight will strike them. Peppers and eggplants should be started the latter part of this month. They require a long growing season and should be given all the advantage that is possible. Celery is also one that is slow growing. All these should be planted in straight rows and watered carefully. Some early cabbage may also be planted at this time, but they are more hardy and do not require the care that the other tender plants do.

If a greater quantity of plants are wanted then it is best to plant them in a hot bed. A hot bed is very easily constructed and can be used for a cold frame after the manure has spent its heat. The hot bed should be put on a well drained site, but should be on the south side of some building where there is a windbreak, and it would be a very great advantage to have it near the path to the barn or where one is passing often. If the bed needs care it will only take a few minutes and it is constantly looked after. The manure in the pit should be thoroughly packed in by tramping and be 12 to 18 inches deep when compacted. The bed can be any width or length that is convenient to utilize the sash, but they are usually six feet. There should be from 3 to 5 inches of good rich garden loam spread over the manure evenly and then the sash put on and the bed allowed to heat. The temperature will rise pretty high, so that no seeds should be sown for about seven days. or when the temperature has fallen to about 80 degrees. Tomatoes, peppers, celery, cabbage, lettuce, and radishes may all be planted in the hot bed. The early lettuce and radishes will soon come on and be used up so that something can be sown in the space. After the manure has cooled down the bed can then be used as a cold frame for the later crops or it can be used for starting sweet potato plants. Some of the plants, such as tomatoes, can be left in when the cover has been removed so that they can utilize the soil and manure there. The plants should be hardened off gradually by removing the sash a little at first and then for longer times until they have become accustomed to the outside air. When a frost comes they can be covered up again and kept until the danger is over.

There are three groups into which vegetables may be divided. First, there are the ones which can be planted before the date of the last killing frost, the second may be planted about the date of the last killing frost, and third, there are the ones which cannot be planted until all danger of frost is over and the ground has warmed up somewhat. In the first group come cabbage, onion sets and seed, peas, parsley, and parsnip. They can be planted by the first of April or even by March 15. In the second group come beets, carrots, cauliflower, celery and sweet corn. The third group comprises melons, cucumbers, pumpkins, and squashes. The second group can be planted by the 15th of April or later, depending somewhat on the weather at the time, but the last group cannot as a rule be planted until the first of May.

Furnas to Compete in Penn Relay.

C. C. Furnas, Purdue University's champion long distance runner and member of the 1920 Olympic teams, will compete in a special two-mile race to be held as a part of the Penn relay at Philadelphia, April 29. Furnas has proven himself the premier distance runner in the Conference, and one of the best in the country, and should place among the very first in this event.

It is very likely that an entire relay team will also be entered, and that Purdue will be represented at the Drake relay held at DesMoines, Iowa, April 23.

Community Organization

By Mrs. Morton Fordice, Russellville,
President Home Economics Association.

"AN organized neighborhood holds its people and helps them to learn the science and to practice the art of living together."

External conditions at present are in many ways favorable to the development in our country of a more satisfying rural life. Many persons have been able to till the soil and to grow crops but have failed at farming on account of discontent which may be traceable to unsatisfactory relations with the people of the neighborhood.

Mrs. Fordice is a very progressive Indiana farm woman who has done Farmers' Institute work for Purdue University for about 15 years, has been active in club work and is now president of the Home Economics Association.

Life is certainly more enjoyable where the members of the community live in friendly relation to each other. Family visiting has usually been found helpful but inadequate, and without some agency for the regular exchange of ideas and impulses a community remains in a state of undeveloped possibilities.

Each community should be considered a little democracy with each adult citizen living within its boundaries a member of it and when all these persons come into common council the common interest is likely to be discovered.

Each person should learn about common problems of his community, should discuss them with other members of his community, and assist in finding a solution for them.

Among the citizens of each community will be persons who are conservative and others who are prone to rush headlong into various undertakings, but when all have a hand in the "round table" the community organization furnishes, problems of community interest will usually find a satisfactory solution and the group of people will be working as one, as through the contact of individuals usually comes toleration, understanding and sympathy.

The wide variety of activities of a community organization should enrich both the intellectual and the social life. Community interest in an organization may be aroused by putting information relative to the work into the hands of every person in the community. Bulletins, leaflets and letters should be distributed. Ministers and other speakers may present the proposition to their audiences. Exhibits and posters may be helpful. A tentative plan for organization may be presented to persons known to be interested in community uplift, as one of the essentials to success is leadership, and when a community fails it may usually be traced to inactivity of its leaders. In most communities there are persons who have the ability and the time required for this work.

A man and a woman who are willing to work for community betterment should be chosen. These leaders should be persons who are unselfish, willing to respect the personality of others, with ability to differ in opinion without ill feeling, persons with well balanced judgment and having faith in the good intentions of the average citizen.

To assist these leaders persons especially fitted for the various lines of work to be undertaken should be selected. Each of these directors should be the head of his department and held responsible for the work expected of it. If there exists in the community a spirit of cooperation the work is usually less difficult than where different groups fail to work in harmony.

Loyalty to one's community has been said to indicate true patriotism, and that it is usually found to be easier to be patriotic to the nation on Memorial Day and the Fourth of July than to be patriotic to one's own community 365 days each year. To be a good citizen means first of all to be willing and able to take part intelligently in the affairs of one's own community.

If in these community organizations lines of work of especial interest to women are to be taken up, Cooking, Sewing and Mothers' Clubs may be formed, while the men perhaps are giving time to the study of

(Continued on page 330)

Purdue Cow Establishes Enviable Record

By Prof. L. H. Fairchild.

ON February 15, Purdue's Golden Estelle 267570, a Jersey cow, owned by Purdue University, at Lafayette, Ind., finished her yearly record of 14,102.1 pounds of milk and 752.35 pounds of fat. This is the highest record that has ever been made in the state by a Jersey cow and displaces that of 721.84 pounds of fat made by Fawnette's Maiden 236047, a cow bred by Messrs. A. L. Wheeler & Son, of Mooresville, Ind. The latter's milk record for the test was 15,016.2 pounds.

She was sired by Estelle's Lad 75654, a bull brought to Purdue from Missouri University in 1909, which had a number of other high testing daughters in the Purdue herd, one of these in the herd at present time finishing this year with over 10,000 pounds of milk and 525 pounds of fat. Estelle's Lad was out of Estelle Thomas, which cow was also dam of Pedro's Estelle, world's champion three-year-old at the time of making her record of 712 pounds of butter. Purdue's Golden Estelle is out of Gorgeous

Purdue's Golden Estelle 267570 in the Jersey herd at Purdue University that finished a test of 752.35 lbs. fat on Feb. 15, and thereby broke the Indiana Jersey record of 721.84 lbs. fat.

Purdue's Golden Estelle is a nine-year-old cow and was bred and developed at Purdue. She was dried up last year the latter part of January, and freshened with a rest of only about two weeks, on February 12, dropping a fine bull calf. The accompanying picture shows her on the day after she finished her record, and she was in even better physical condition at this time than at the beginning of her test. At the finish of her year she was milking about 28 pounds per day.

Golden Morn 256448, who made 431 pounds of fat as a junior three-year-old, and was sired by Gorgeous Boy, who had 13 daughters in the Purdue herd that have made register of merit requirements.

Not only has this cow come from some high-producing ancestors, but she has done considerable producing herself. The following figures show her production for five lactation periods of over 300 days in length:

	Days	Lbs. milk	Lbs. fat
2-year-old	365	5,789.0	299.23
4-year-old	306	6,394.4	321.83
6-year-old	365	10,546.2	558.70
7-year-old	305	7,098.9	374.93
8-year-old	365	14,102.1	752.35

In addition to her ability as a persistent producer, she has also shown her value as a reproducer, having dropped seven calves—four heifers and three bulls—since her first freshening. Only one of those daughters is in the Purdue herd at the present time, but she is showing the great transmitting power of her dam. This daughter is Estelle Joan 390-399. As a junior two-year-old she made 491 pounds of fat, and freshening again as a three-year-old she has started out at a rate that bids fair to make a state record in her class also, as she has in three and a half months 243 pounds of fat. Purdue's Golden Estelle seems to have come through her year's work in fine condition and should be ready to start out on another year to make as large or even a larger record.

Her production by months is as follows:

Feb. (14 days)	660.0	4.85	32.01
March	1,664.3	5.17	86.04
April	1,338.0	4.60	61.55
May	1,479.0	5.18	76.61
June	1,282.0	4.99	53.97
July	1,250.0	4.76	59.50
Aug.	1,239.0	4.95	61.33
Sept.	1,118.0	5.18	57.91
Oct.	1,042.5	5.40	56.30
Nov.	853.4	6.43	55.70
Dec.	901.4	6.59	59.39
Jan.	874.0	6.44	56.28
Feb. (15 days)	400.5	6.44	25.76
Total	14,102.1		752.35

Estelles Joan 390399, daughter of Purdue's Golden Estelle. She has a record of 491 lbs. fat as a junior two-year-old and is now going a good clip as a three-year-old.

In making this test, Purdue's Golden Estelle has in all probability won the Production Cup of the Indiana Jersey Cattle Club, for test finished in 1921 is the third year of competition for it. Several Indiana breeders have their eyes fixed longingly on an 800 pound record.

That waiter must be very stupid or have a keen sense of humor. I asked for a beef extract and he brought me a glass of milk.

The man who wants to have a good standing in his church, will have to do some sitting in the pews.

The Business of Raising Chicks

By T. S. Townsley, '16.

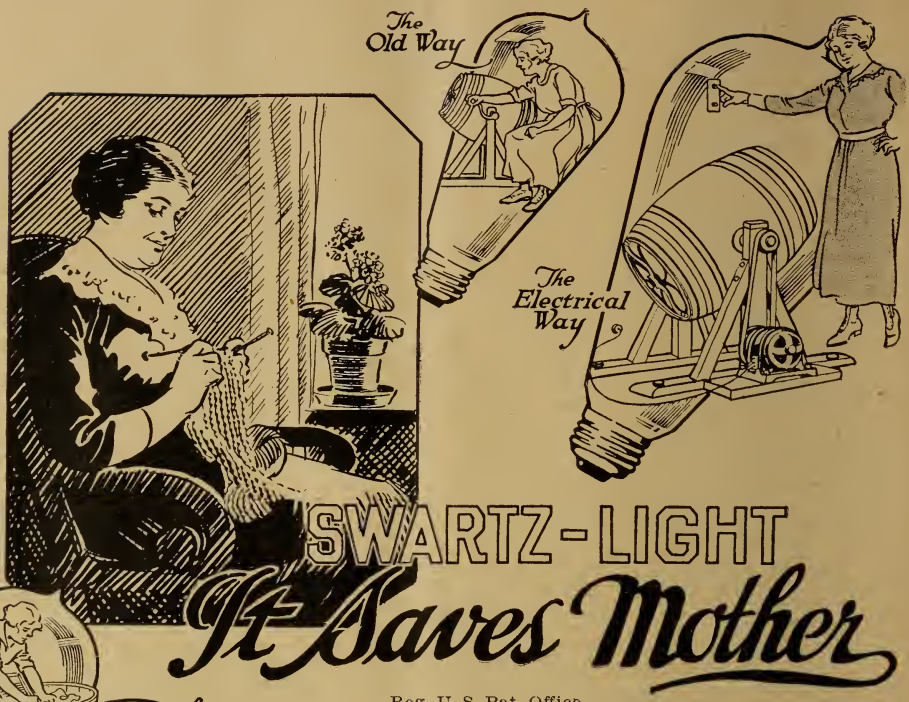
THE success of most poultry keepers is determined quite largely by their ability to raise chicks. It is agreed among poultrymen in general that chick raising is the most difficult part of the entire poultry keeping operation, and it is a matter of common observation that the men and women who can grow their chicks successfully can make a handsome profit in the poultry business if they use ordinary common sense in connection with the other operations of poultry keeping, such as breeding, feeding, housing, and marketing.

Mr. Townsley was president of nearly every organization of which he was a member while in college. In appearance he was a quiet unassuming fellow. He supported himself throughout his college course and also maintained a high scholastic standing. Graduating in 1916, he went to Kansas State Agricultural college as assistant in Poultry Husbandry, and in 1917 he went to Missouri University in charge of Poultry Extension.

Where chick raising is carried on by natural methods with the major part of the responsibility being placed upon the mother hen, the characteristics of the hen used play an important part in the results secured, but where chicks are raised by artificial methods the results depend almost entirely upon the skill of the attendant and the equipment provided for mothering the chicks. Chick raising operations have been carried on more or less haphazardly on most farms until very recent years when the introduction of modern hatching and brooding equipment has given an opportunity for the flock owner to put his chick raising activities on a businesslike basis. In hatching and brooding chicks with hens the flock owner is at a decided disadvantage on account of the difficulty of persuading the hens to set at the most desirable time. It is generally agreed that March and April hatched chicks are the most valuable, but in many cases the hens will not set early enough to hatch a very large proportion of the chicks during those months. Man has not been able to perfect a machine that will hatch a larger per cent of the eggs set than can be done by the natural method, but there are so many disadvantages to hatching with hens that on farms where chick raising is of any considerable importance the hen is being deprived of her age-old privilege of furnishing the heat to foster the development of her offspring and the job is being turned over to machines. There is still some prejudice against incubators in the minds of some farm poultry keepers, but these are largely the result of experiences with poorly constructed incubators and are being rapidly dispelled by the fine results secured by the people who are using modern, well built machines. The claim that hen hatched chicks are stronger than those hatched in incubators depends entirely upon the kind of incubator used. It is perfectly true that some of the machines on the market are so constructed that the chicks are almost certain to be weakened by improper temperature and moisture conditions during the hatching period, while on the other hand, there are a number of well built incubators which can be had today which will hatch a strong livable chick out of every hatchable egg.

Hatching chicks is usually much less difficult than raising them after they are hatched. No adequate figures are available to show what proportion of the chicks hatched on farms are lost during the early weeks of the brooding period each year, but impartial observers admit that the percentage is very high. It is by no means uncommon to hear poultry keepers state that they are not able to raise more than half of the chicks hatched. The kind of chick hatched has an influence on the ease with which it will be raised, because weak chicks are hard to raise under any conditions, but it is also true that a large per cent of the chick losses which are now suffered are preventable losses and are due to poor brooding equipment or careless methods of handling the birds.

In brooding with hens many chicks chill to death, especially during the early spring months, because the hens will not stop to



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Reg. U. S. Pat. Office

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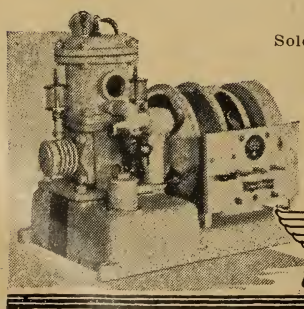

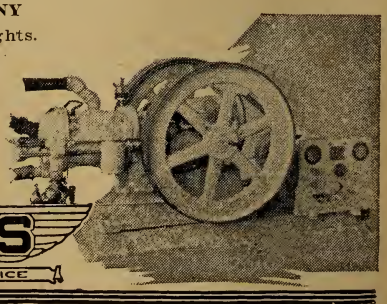

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hover them when the little fellows become damp and cold. Spring storms also commonly take heavy tolls of baby chicks brooded with hens because the mothers fail to get the chicks into a safe, dry place. These losses from drowning and chilling when chicks are brooded with hens can be largely eliminated by keeping the hen confined during the first few weeks of the brooding period. On many farms where hen brooding is still practiced, all the hens with chicks are kept confined in coops 2½ or 3 feet square so that at any time the chick needs shelter it will know where to find the mother hen and the hen will not have the wanderlust in her mind to prevent her from stopping to hover the flock when her body heat is needed. Poultry keepers generally agree that the disadvantages of hen brooding are greater than the disadvantages of hatching the egg by the natural method, and modern brooding equipment is rapidly taking the place of the primitive plan of allowing the hen to do the brooding.

The introduction of the stove pipe brooder has supplied the poultry keeper with the long sought businesslike method of handling baby chicks. On a large number of farms the chicks are now hatched in batches of 300 to 500 and this number is brooded in one flock with the heat being furnished by a small coal or oil stove. Stove brooders are proving remarkably effective and are rapidly revolutionizing chick raising methods in many sections. It is claimed that the invention of the stove brooder is nearly as important to the poultry industry as the self-binder has been to the wheat grower because it eliminates a large amount of labor in connection with the brooding operations and permits of the handling of large units.

Probably more people have come to grief through trying to brood chicks without heat than from any other cause, but many of the earlier types of lamp brooders were very unsatisfactory and caused heavy mortality in some flocks. The fireless brooder is entirely contrary to nature, because the chick is so built that it needs heat applied to its back to warm it up quickly and protect the vital organs. The objections to the small lamp brooders are that they usually are poorly ventilated, are hard to clean, and the source of heat is not very reliable. In many cases the lamps on these brooders go out, with the result that the chicks pile up and smother each other to death, or in other cases the lamp gets so hot that the birds are overcome by the fumes, while the danger of fire is not inconsiderable with many of the lamp heated hovers. The stove brooders furnish a steady, reliable supply of heat which is applied to the back of the chick in the natural manner, and the stoves have the advantage over hens in that one stove will do the work of at least twenty hens and is not as temperamental as even one hen is likely to be.

The heaviest chick loss usually occurs during the first ten days of the brooding period, and a considerable per cent of the chicks that die show evidences of bowel trouble which is usually called "white diarrhea." In most cases the whitish diarrhea is evidently a symptom rather than a disease, as it is a well known experience of poultry keepers that improper temperature conditions, especially allowing the chicks to become chilled, will cause digestive disturbances, usually resulting in death, with white diarrhea as the principal symptom. Where the chicks are kept from being chilled and are not subjected to too high temperatures, white diarrhea very seldom develops. On hundreds of farms the introduction of stove brooders has caused the complete disappearance of white diarrhea among the baby chicks.

Feeding methods also contribute to the success of raising the chicks, and it is generally agreed that over-feeding during the first few days is a prominent cause of the heavy losses. The general rule among successful chick feeders is not to give any food until the chicks are at least two days' old and then to feed lightly on easily digested material. In many flocks the chicks are started on rolled oats and the results secured with this are quite satisfactory. In addition to the rolled oats or other fine chick food, the baby chicks should be given milk to drink or, if milk is not available, hard boiled eggs at the rate of one egg to each fifty chicks should be chopped up and included in the ration. After the chicks are a week or ten days' old, most successful growers add a dry mash to the ration. This mash usually contains bran and shorts, and if milk is not available, one-fourth of the mash usually consists of commercial meat

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AGRICULTURIST ESSAY CONTEST.

According to the present plan of the Agriculturist Essay Contest, prizes will be awarded for the best essay in each of the six departments. In order to centralize the contest, and awaken further interest, a sweepstakes contest will be held. The six winning essays in the State contest will be judged by a committee of five, and the best of these six chosen. The winner of the sweepstakes will receive a silver loving cup, and other prizes in addition to the prizes for being first in the department.

There will be second and third prizes in the sweepstakes also. The essay which wins the sweepstakes will be published in a number of magazines and will be reproduced in the Agriculturist.

Twenty-four Indiana High Schools have entered 100 per cent of their Agricultural Vocational students in the contest.

Following are the prizes which have been donated to date for the contest:

The Farm Journal, Washington Square, Philadelphia, Pa.—Monthly, 4 books (Biggle).

The Ohio Farmer, Cleveland, O.—Weekly (Saturday), 3 one-year, 2 two-year, 1 three-year, and 1 five-year.

Wallace's Farmer, Des Moines, Iowa—Weekly (Friday), 6 one-year.

National Stockman and Farmer, Pittsburgh, Pa.—Weekly (Saturday), 3 one-year.

American Farming, Chicago—Monthly, 10 two-year.

Power Farming, St. Joseph, Mich.—Monthly, 6 one-year.

Better Farming, Chicago, Ill.—Monthly, 10 one-year.

American Swineherd—Semi-monthly, 15 one-year.

Edwin D. Logsdon—$6.00 cash donation.

American Hereford Journal, Kansas City, Mo.—Semi-monthly, 10 one-year.

Poland China Journal, Kansas City, Mo.—Semi-monthly, 10 one-year.

American Agr. Chem. Co., Cleveland, O., to, Ohio Farmer—Weekly (Saturday), 1 one-year.

Jersey Bulletin, Century Bldg., Indianapolis—Weekly, 5 one-year.

Country Gentleman, Curtis Pub. Co., Philadelphia—Weekly, 3 one-year.

Aberdeen Angus Journal, Webster City, Iowa—Weekly, 50 one-year.

The American Guernsey Cattle Club subscriptions to the Guernsey Breeder, Peterboro, N. Y.—10 one-year subscriptions.

The Chester White Journal, Rochester, Ind.—10 one-year subscriptions.

Wilson & Company, Chicago—$20.00 cash donation.

The Holstein-Friesian World, Lacona, N. Y.—Not definite yet.

Farm Life, Spencer, Ind.—10 one-year.

John Wiley & Sons, Inc., New York—4 books as follows: "Late Cabbage," by Reed; "Handbook for Farmers and Dairymen," by Woll; "Dairy Cattle Feeding and Management," by Putney.

PURDUE TOPS CONFERENCE.

WITH the 1921 Conference basketball season a matter of history, we may pause to distribute the glory to whom it belongs, namely, "Piggy" Lambert and his fighting Boilermakers.

Starting with the team, which was admitted to be weak by all authorities, Purdue has done little less than the marvelous. They are in a triple tie for first place with Wisconsin and Michigan—they have the highest individual point-getter in the Conference, Captain White—they lead the Conference in team scoring, and have two men who have earned undisputed berths on the mythical all-Conference team, namely, Captain White and Raymond P. Miller, the husky back guard.

To be sure they have had their ups and downs. They lost games they should have won, and also they won games when the entire Conference gave them credit for a good drubbing, but throughout the entire season they played that clean, scrapping, heady ball which is the earmark of a good team properly coached in sportsmanlike play.

Purdue's Conference Record.

Purdue 34, Northwestern 19.
Purdue 40, Ohio State 32.
Purdue 27, Indiana 19.
Purdue 23, Michigan 28.
Purdue 26, Illinois 39.
Purdue 41, Ohio State 23.
Purdue 15, Iowa 20.
Purdue 29, Illinois 19.
Purdue 24, Northwestern 15.
Purdue 15, Michigan 18.
Purdue 29, Indiana 19.
Purdue 21, Iowa 18.

THE PURDUE AGRICULTURIST

Published monthly during the school year, by Agricultural Students of Purdue University, LaFayette, Indiana.

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The purpose of THE PURDUE AGRICULTURIST is to disseminate the latest scientific knowledge concerning Agriculture and Home Economics, to incite the young people of Indiana to a greater desire for training in Agriculture and in the industrial pursuits, to publish matters of interest concerning the Purdue School of Agriculture and the Purdue Experiment Station, and to afford opportunity to the students for training in Agricultural journalism.

COMMUNITY BREEDING.

The propagation of one breed of livestock as a community enterprise is a distinctly modern development in livestock breeding. Community breeding, as it is called, is a distinct departure from the old order under which the large breeder reigned supreme, and marks the beginning of better times for the small breeder. The deep-rooted but erroneous idea that a large amount of capital is the one prerequisite of success in breeding is giving place to the realization that a community of small farmers working as a unit can do just as fine constructive work as the wealthiest breeder working alone. In this way a given community may become widely known for producing good stock of a certain breed, and indeed several such communities are to be found here and there throughout Hoosierdom. Thorntown is the center of the best known hog breeding community in the corn belt; clustered about Ft. Wayne are several Shorthorn farms; Huntertown is well known for its Belgian horses; while Lebanon is noted for its Guernsey cattle, and Montgomery county for its Shropshires.

A community that has attracted national attention is the horse breeding district around Delaware, Ohio, where some of the very best Percherons of America are produced. All the breeders there are general farmers who keep a few pure bred mares for doing the farm work and raising colts. In a recent sale catalogue of one of these breeders only eight animals are listed, but each one is rich in the bluest blood of the Percheron breed. A study of this man's offering shows these animals to be the progeny of four mares and sired by two of the breed's outstanding sires. No breeder keeping only four mares could afford to own alone, either of these stallions.

This case, then, makes plain some of the advantages of community breeding. The small breeder has access to sires of a higher class than he can afford to own alone. He will have a much better outlet for his surplus stock either through selling to his neighbors or to buyers attracted by the fame of the community. Close daily contact with men engaged in similar work, and an intimate acquaintance with their stock furnishes a fund of invaluable information and generates a friendly rivalry which is one of the strong incentives to progress. The small isolated breeder who hasn't the necessary capital to go to the big shows and fairs is very apt to fail just because he becomes satisfied with his own stock and his own methods. Another big benefit arising from community breeding is the fact that the sons of these small farmers are very apt to stay in the breeding business and carry on the good work when the father leaves off. This gives permanence and stability to our livestock industry.

No man should hesitate longer if capital

is his limiting factor. Let him interest his fellow farmers in the cause of better livestock and mobilize their interest in a concrete way. The day of the small breeder is at hand and he has or can have through cooperation the opportunity of doing some real constructive breeding.

FARM LABOR AND WAGE.

With the approach of the rush season, farmers and farm hands are wondering what the price of farm labor is going to be this summer. Gauged by the cost of living, wages should still be about 70 per cent higher than in pre-war times; if an attempt is made to compete with city labor, they should also remain high; but if judged by the price received for farm products, wages must drop considerably.

Last year, married men working on Indiana farms received an average of about $70 a month, and single hands, $55. There is no doubt, however, that with the increased supply of available labor and the decreased returns from farm products that there will be a marked reduction this summer. The problem is just how large this reduction should be.

The Kankakee, Illinois, Farm Bureau has worked what might be termed a profit sharing scale on a corn price basis. If the price of corn is less than 70 cents per bushel between husking time and March 1, the minimum wage for single men should be $35 and for married men $50. If corn goes to 80 cents, then single men should get $40; if it goes to 90 cents, they should get $45; if $1.00, $50. Wages for married men correspond.

Such wages do not appear particularly alluring to the college student seeking vacation employment. But be it remembered that a summer's experience in the line of work to be pursued in the future will be worth far more than mere dollars and cents.

FARMERS' FEDERATION PLAN FOR YEAR.

No organization can keep alive without definite lines of activity, nor can it accomplish much without unity of action. The Farmers' Federation of Indiana has early realized this. When the county organizations have said, "Now that we are organized as you wished us to be, what is the work we should do?" The State Federation Committee has answered by a comprehensive suggestive outline of activities:

1. Production:
   - A. Agricultural Credit.
     1. Hold conference of all bankers of county, all county and township officers and a representative from the state office for the purpose of agreeing upon a system of local credit.
   - B. Encourage more economic production of livestock, crops and farm products.
   - C. Encourage the keeping of cost account records of producing farm products.
2. Marketing:
   - A. Advocate and encourage the organization of:
     1. Co-operative elevators on a patronage dividend basis where an eoonomic need exists.
     2. Co-operative shipping association where needed.
   - B. Appointment of county federated marketing committee according to plan of federated marketing service.
   - C. Wherever possible, collective buying should be done on a community or township basis.
3. Community Welfare:
   - A. Organization:
     1. Hold regular monthly meetings of board of directors.
     2. Have board of directors outline the farm bureau activities of the county for the year by analyzing the problems of production, marketing and community welfare.
        - a. Determine the source of income of farmer.
        - b. Determine the factors limiting these sources of income.
        - c. Determine the remedies for these troubles.
     3. Adopt uniform accounting systems and make a county budget.
     4. Adopt uniform constitution and by-laws.
     5. Arrange schedule of the regular township meetings so that no two meetings come on the same night.
     6. Organize a County Speaker's Bureau.

WHICH WAY IS YOUR STOCK GOING?

Down With the Scrub—Up With the Pure-Breds.

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Woodford 8th, Woodford 71st, Disturber Magnet.
Herefords for Uniformity and Utility.
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PICKETT AGAIN and MOLLIE'S CLANSMAN head our herd.

Our sows are the best. Several by Disher's Giant, Evolution, Big Bob Orphan and others. For sale at private treaty only. TRIED SOWS, GILTS bred or open.

BIG TYPE POLAND FARM,
Loogootee Indiana.

7. Keep members informed of the Farm Bureau activities by monthly news letter.
8. Co-operate promptly with State and American Federation in carrying out their program.

B. Civic Interests:

1. Co-operate with circuit judge in appointment of County Board of Tax Review.
2. Co-operate with County Commissioners in the appointment of County Road Superintendent.
3. Co-operate with County Board of Education in the selection of County Agent.
4. Encourage get-together meetings between city and rural people.
5. The merits of Farmers' Mutual Insurance Companies should be carefully considered and support given them where justified.

These and many other problems of local interest will provide subjects for profitable study and active work in the county and township organizations.

At the first meeting of the Dairy Committee of the Indiana Federation of Farmers' Associations, held in Indianapolis, March 11, plans were formulated to hire a director for the newly organized Dairy Department, who will do constructive work along marketing lines. This may include the formation of marketing organizations in the larger cities of the state for the purpose of selling the entire output of milk produced by the farmers in that district. Under this plan the retail distributors of market milk and cream would be supplied, and the surplus milk handled by the company in the best possible manner. Further work includes the organization of milk committees similar to the one now in operation at Evansville, representing the different interests for the purpose of arbitrating the problems of supply, quality, consumption and price, in the smaller towns and cities of the state, and the organization of co-operative cream buying stations as a means of marketing cream on a quality basis. The director is to co-operate with the Extension Department of Purdue University in promoting an educational program to further the dairy interests of the state, and during the coming year is to emphasize the dairy products campaigns for increasing the consumption of milk and its products, and will also promote the pure bred sire campaign. He is further to recommend and promote such legislation as is deemed necessary to promote and protect the dairy interests of the state, and to study all legislation affecting the dairy industry which may be promoted from other sources and to present to legislators and to the dairy interests the recommendations of the committee regarding such legislation.

To co-operate with the director, each county is to establish a dairy committee under the farmers' association to represent the dairy members and to act as a medium through which the director can work in the county.

Velvet beans planted with corn do not materially affect the yield, but give 900 pounds of shelled beans or the feeding equivalent of sixteen additional bushels. Finished cattle are shipped direct from the velvet bean pastures.

The Country for the YOUNG FARMER

COME to the country along the Seaboard, where land is low priced—where beef and pork are made—not with high-priced concentrates and hay, but with home-grown concentrates and year-round pastures. Here is where the young man can buy a farm without staggering for years under a heavy mortgage.

This productive territory has more farms than farmers. It offers pioneer opportunities without their hardships.

The feed crops are different from those of the North, but yield amazingly. The average acre of peanuts will make as much pork as 60 bushels of corn—sweet potatoes make as much as 100 bushels of corn.

Velvet beans planted with the corn yield the feeding equivalent of sixteen additional bushels besides an immense amount of hay. Cattle are turned into the fields to harvest their own balanced rations—rapidly get into condition for market.

20 to 30 Tons of Silage

In Florida, south Georgia and Alabama it is possible to fill the silo almost any time of the year. Japanese cane yields twenty to thirty tons or more of good silage per acre. No sheltered barns are needed.

Farmers Wanted!

Here is the opportunity for the young man to buy productive prairie land where beef and pork can be made at lower cost than in the North and West.

Fill out the coupon and get full information about the Seaboard Country.

JESSE M. JONES,
General Development Agent,
SEABOARD AIR LINE RAILWAY,
Room 600 Royster Building,
NORFOLK, VIRGINIA.

A Note to Jesse Jones

General Development Agent
Seaboard Air Line Railway
Room 600, Royster Bldg., Norfolk, Va.

I am interested in the following kind of farming along the Seaboard—

	Wish to locate in (check state preferred)
( ) Orange growing	( ) Fla.
( ) Vegetable growing	( ) Ga.
( ) Livestock	( ) Ala.
( ) Dairying	( ) S. C.
( ) Peaches, berries, melons	( ) N. C.
( ) General farming	( ) Va.

Please send me your booklet and full information.

Name_____

P. O._____

Seaboard

the south's newest great railway

The Purdue Egg Show

The greatest show of its kind is the Purdue Egg Show and it is run entirely by members of the Freshman class in Agriculture. A committee of eight men elected by the class makes all the preparations for the show, including the publication of a thirty-six page catalog.

The Purdue Egg Show was the first of its kind in America, and has kept its lead throughout the thirteen years of its existence. Last year over four hundred dozen eggs were judged and prizes were awarded in six classes. National recognition is gained by the show, and eggs are received from all parts of the country, and some from Canada.

The committee which is in charge of the 1921 show is as follows: Claire W. Jackson, president, Hartford City, Ind.; C. C. Hadley, vice-president, Mooresville, Ind.; W. P. Watson, secretary, Prairie Creek, Ind.; W. R. Amick, treasurer, Scipio, Ind.; George Fross, publicity manager, Indianapolis, Ind.; W. J. Emerson, superintendent, Owensville, Ind.; F. C. Miller, assistant superintendent, Connersville, Ind.; and B. D. Thomas, business manager, Greenfield.

The show will be held May 2, 3, 4 and 5, in Agricultural Hall.

The Purdue Egg Show Committee.
Top Row, Left to Right—Prof. L. H. Schwartz, F. C. Miller, George Fross, C. C. Hadley.
Lower Row—D. B. Thomas, W. R. Amick, Claire W. Jackson, W. P. Watson, W. J. Emerson.

Winter Course Closes.

The annual winter course closed on March 11 after one of the most successful seasons since the foundation of this institution. The closing exercises were held on the afternoon of March 11 in Agricultural Hall. Appropriate music and a short address by President Stone concluded the program. The enrollment this year was quite large, certificates being issued to 77 students who satisfactorily completed the course as outlined.

MORAL—MARRY A FARMER.

The work of the average Nebraska farmer's wife is worth $4,004 a year, according to a survey made by Miss Margaret Fedde, head of the Nebraska College of Agriculture Department of Economics.

It is rumored that the eggs from the experimental pens, where they are testing the effect of alcohol on the life processes of some chickens, sold for only ten cents more on the dozen than the ordinary product.

ARCADIAN
Sulphate of Ammonia

The Value of the Acid Residue

Sulphate of Ammonia is acted upon in the soil by bacteria. The ammonia is split apart from the sulphate radical and the nitrogen is oxidized to nitrate, in which form it is used by the plant.

As a result of these actions, the sulphate radical is left as an acid residue, and must be neutralized by the bases of the soil. Experiments show that for every 100 pounds of *Sulphate of Ammonia* applied to the soil there is used, in neutralizing the sulphate radical, bases equivalent to approximately 78 pounds of calcium carbonate or ground limestone.

In a soil well supplied with bases, especially calcium carbonate, this acid residue is of benefit to plant growth. It sets up in the soil a digesting process which changes unavailable plant foods into an available form. The principal elements thus made available are phosphorus and iron, though potassium and other valuable elements may be released to the plant. It thus serves one of the important functions of a green manure crop plowed under.

Where the soil is naturally low in bases, i. e., in acid soils, the long-continued use of *Sulphate of Ammonia* may bring into solution certain soluble salts in sufficient amounts to prove detrimental to plant growth. Just such a condition has resulted at the Pennsylvania Experiment Station, where large amounts of *Sulphate of Ammonia* have been used on the same plots for a period of 39 years.

During the first ten years of these experiments, *Sulphate of Ammonia* produced higher yields than the other carriers of nitrogen with which it was compared, and it required 20 years for the nitrate of soda plot to equal the *Sulphate of Ammonia* plot in total yield. At the end of 39 years, the loss of lime has altered these relations. Laboratory pot tests with soil taken from these plots have shown, however, that an application of lime will bring the *Sulphate of Ammonia* plots again to highest yields.

The layman is often led to believe that the acid residue makes *Sulphate of Ammonia* less desirable than certain other forms of nitrogen. Recent experimental work indicates that the acid residue is a most desirable property of this fertilizer, providing the lime supply of the soil is maintained.

The cost of supplying the extra lime necessary to maintain proper conditions amounts to less than 25 cents per hundred pounds of fertilizer applied, and the added value from the special properties of *Sulphate of Ammonia*—such as quick-availability, resistance to washing away, fine and dry condition, the ability to make other plant foods available, and low original cost—more than warrants this slight extra expense.

During the first 5 years of the Pennsylvania experiments, 48 pounds of nitrogen, as *Sulphate of Ammonia*, produced $4.60 worth more crop than did the same amount of nitrogen in the next best carrier. The value of the extra lime removed by the *Sulphate of Ammonia* was less than 60 cents.

Write Desk No. 16 for a digest of Experiment Station reports showing the value of Sulphate of Ammonia properly used.

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Medina, O.

AGRICULTURAL DEPARTMENT, NEW YORK

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Manufacturers of

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Write Us for Further Particulars.

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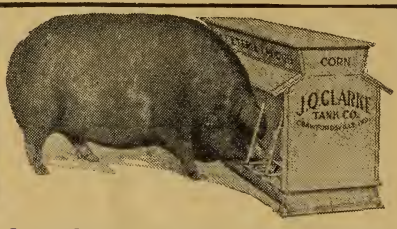

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is the most **wonderful** feeder on the market. Will feed down and out **all kinds of feed** better than any other feeder. Write for catalogue today.

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LaFayette Printing Co.

CATALOG
PRINTERS

LAFAYETTE, INDIANA

Annual Boys' and Girls' Club Roundup to Be Held May 3, 4, 5 and 6.

The third annual Boys' and Girls' Club roundup will be held the first week in May, beginning on Tuesday, the third, and ending Friday, the sixth. Tuesday, the opening day, will be taken up by registration and a general inspection of the campus and engineering laboratories, which will be held open and in working condition. Interesting programs have been planned for each evening. President Stone and Dean Skinner will give talks on Wednesday evening. On Thursday evening the English Department will give a play. Addresses by prominent speakers will feature the program. Dr. Schweitzer, of the State Board of Health; Miss King, and Prof. Christie are included on the program.

The annual Freshman Egg Show will be given at the time of the roundup, and all the club members will be invited to participate, provided they bring their own eggs.

THE BUSINESS OF RAISING CHICKS.

(Continued from page 316)

scrap or tankage. Probably the best way to feed the mash is in self-feeding hoppers where the chicks can eat all they want.

Modern methods of chick raising, including the use of well built incubators, brooding with stove brooders, and careful attention to feeding methods during the first ten days of the chick's life, will go far to reduce the chick losses which are now so common on many farms.

WELL, WE HOPE SO.

During "Farmer's Week" a farmer from "somewhere in Indiana," visited the experimental sheep feeding barns at the University, when the attendant was doing the evening work. He seemed greatly interested, and a little critical.

Farmer.—"Why don't you put in a running water system and a tank, instead of carrying all the water in a pail?"

Attendant.—"We use this method because we want the conditions of this experiment to be as near like the average farm conditions as possible."

Farmer.—"Well, if you don't make some changes the average farmer is going to be 'way ahead of you fellows down here."

International Hay Machines Speed Up Hay Harvest

There are two big reasons why it is desirable to speed up hay harvest—the cost of labor and the pressure of other work. The quickest and most economical way to speed up haying is to employ efficient time and labor-saving machines. McCormick, Deering and Milwaukee mowers are light in draft, easy to handle, and can be depended upon to cut hay every minute. McCormick and Deering rakes get all the hay. International tedders hasten curing. They also insure more uniform curing and, therefore better hay. The International combined side-delivery rake and tedder is an economical machine in that it can be changed instantly to rake or ted.

Think of the time and labor an International hay loader would save the busy man! Hay makers know its popularity. International sweep rakes and stackers are big time and labor savers especially suited to large acreages.
International hay presses multiply hay profit by putting the hay in the most economical shape to handle, haul, feed, and store. The smooth, tight, neat appearing bales from an International hay press bring the highest market price. Sold by International dealers.

INTERNATIONAL HARVESTER COMPANY
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CHICAGO U S A
92 Branches and 15,000 Dealers

HANSEN'S

Dairy Preparations

For cheese and butter making on the farm as well as in largest creameries and cheese factories, Hansen's preparations are standard. They are **pure, concentrated, and simple to use.**

Use **Hansen's Rennet Tablets,** Rennet Extract or Lactic **Ferment Culture** for cheese making (in the small dairy **Junket Brand Buttermilk Tablets** are used to advantage for cheese making).

Hansen's Danish Butter Color, and **Hansen's Cheese Color** are used in the finest creameries and cheese factories. Hansen's products are on sale at drug or dairy supply stores or sent direct.

"The Story of Cheese Making," by J. B. Frederiksen, free on request.

Chr. Hansen's Laboratory, Inc.

Little Falls, N. Y.

BULLETIN FILES

File your Purdue Bulletins so you can find what you want when you want it. We carry them in stock, complete with set of Printed Index Tabs, covering everything on the farm.

20 cents each

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LAFAYETTE, INDIANA.

INQUIRIES FROM OUR READERS.

Question: In my first hatch a large percentage of chicks died in the shell in spite of the extreme care I gave to the operation of my incubator. The eggs I selected were large and well proportioned. Can you tell me what is likely to cause this condition?

Answer: The cause is likely to be further than the incubator. One may be a lack of vitality and vigor in the original breeding stock. Another may be that the eggs were kept longer than two weeks before setting without care to see that the temperature was kept below 65 degrees. The result in either case would be a loss in vitality.

Question: I set 400 of the best eggs from my flock of well-cared for, range bred R. I. Reds, and on the seventh day candled out 150 infertile eggs. Can you tell me what is the matter?

Answer: Birds that are too fat produce infertile eggs, also extremely nervous hens do the same. Check up on your flock, find the hens that are the offenders and get rid of them.

Question: One of my best heifers has a skin disease. It is in spots and appears as if it were the result of a burn. The hair is off and the place is dry and cracked. Please tell me what it is?

Answer: Ringworm. Remove the scabs and paint twice daily with tincture of iodine until it is cured.

Question: Is blackleg an infectious disease?

Answer: Yes, blackleg is an infectious germ disease but not always contagious. It finds entrance through wounds of the skin.

Question: I am interested in silos and soiling crops, and would ask you whether you could recommend a reliable publication or book, showing how to build, fill and manage a silo, by whom published, and cost?—Vladivostock, Russia.

Answer: Farmers' Bulletins 556 and 589 may be secured from the U. S. Department of Agriculture, at Washington, D. C., for about 5 cents, and a pamphlet, "Silage Methods," may be secured at a moderate cost from the Silver Manufacturing Company, of Salem, Ohio.

The Winter Course Students Showed the Real Purdue Spirit When They Raised the Total of $2,700 for the Purdue Union, or an Average of $67 per Man.

Cletrac Speed Gets In More Seed

THOSE first few days when ground and weather conditions come just right for planting—that's when speed counts. And Cletrac has it to burn.

Cletrac is no quitter. In seeding—or any other operation—Cletrac sticks to the finish. It holds its steady gait and gets the work cleaned up in short order.

The two wide tank-type treads get a firm grip on the soft, loose seedbed. No power is lost through digging in. Cletrac always delivers the full-rated draw-bar pull of its big motor.

Cletrac's short turn ability makes it mighty handy. Its heavy-duty motor is unusually flexible—develops ample power at all speeds. Its easy handling and wide utility recommend it to farmers everywhere.

Every agricultural student should have a copy of *"Selecting Your Tractor"*. It tells the whole story of power farming the Cletrac-way. We will gladly send you the booklet on request.

HARD THIS WAY BUT—

EASY ON A TRACK THE CLETRAC WAY

SPECIFICATIONS

Horsepower: 12 at drawbar, 20 at belt-pulley.

Length: 96 inches.

Width: 50 inches.

Height: 52 inches.

Weight: 3420 lbs.

Turning Circle: 12 ft.

Traction Surface: About 800 sq. ins.

Center to Center of Tracks: 38 inches.

Belt Pulley: Diameter 8 in., face 6 in.

THE CLEVELAND TRACTOR CO.

"Largest Producers of Tank-Type Tractors in the World"

19123 Euclid Ave. **Cleveland, Ohio**

Cletrac *TANK-TYPE TRACTOR*

Baseball Prospects.

Purdue has the best baseball prospects and the best Conference schedule in years. Only two men were lost by graduation from last year's team, and many men from last year's Frosh nine are bidding fair to snatch berths from last year's regulars. The team, under the tutelage of coaches Pierce and Lambert, promises to be composed of sluggers and consistent fielders, backed up by a fairly reliable pitching staff.

Captain Roberts, and Hiser, of last year's team, are having a lively little duel over the catcher's job. Strack, a man who failed to get a letter last year because of an injury to his ankle early in the season, seems to have the first base position cinched. Strubbe will in all probability hold down his old position at second. Morgan and Hanna seem to be the likely contenders for short stop, with Murphy, Kendrick, and McCarty battling for the hot corner.

The outfield will probably be comprised of Faucett, Standwood, and White, of last year's team, although K. I. Faucett, Gleason, and Elsnor will probably give them a run for these positions.

The pitching job will be amply cared for with such men as Volkstadt and Johnson showing up unusually well, and in addition, Wagner and Wallace from last year's nine.

Such a team will bear watching. Watch their smoke, Purdue backers, and unlucky opponents.

Purdue Has Series of Religious Conferences.

With Dr. Henry Sloane Coffin, one of the foremost ministers and lecturers of America as the principal speaker, a student Christian conference was held at the University on March 8, 9 and 10. Dr. Coffin delivered a series of six lectures on the general subject of "A Working Religion" to the student body. Those addresses were supplemented by after dinner talks at fraternities by ministers and faculty members.

The lectures, the first of their kind to be given here, were heard by practically the entire student body and community, and were considered a pleasing success.

THAT PINNED HER DOWN.

"Mother, I just took a splinter out of my hand with a pin!"

"A pin! Don't you know that's dangerous?"

"Oh, no, Mother. I used a safety pin."—Science and Invention.

SEED CORN

We have only a limited amount of

THE FAMOUS PETER LUX SEED CORN

both in White and Yellow grown by him. Write us immediately about your spring requirements and we will quote you on this as well as corn from other well known growers.

A postal will bring our garden and flower seed catalogue of home and foreign grown.

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have opened up their new stock pens located at all stations and other convenient points on the Northwestern Division between LaFayette and Indianapolis; also between Crawfordsville and Indianapolis. Your attention is called to a few of the special features of shipping your live stock via Electric Railway:

Shipments delivered in pens in Indianapolis in from two to three hours after loading;

Private tracks into Indianapolis yards;

Shipments handled any hour day or night;

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A trial shipment will convince you of our superior service.

Address Traffic Dept., 208 Terminal Bldg., for further information.

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Our product guaranteed in all respects the same as other High Grade Twine.

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A Higher Ideal

There would be no advantage in devoting the most valuable years of one's life to gain knowledge and experience, if greater possibilities and achievements were not forthcoming.

It is then proper to assume that because of his exceptional scientific training the agricultural college man is progressive, well advised in the most modern dairy practices, and the methods that are likely to make dairying the most profitable.

You know that profitable dairy production cannot succeed without cleanliness, and you should also know that

Wyandotte Dairyman's Cleaner and Cleanser

is capable of maintaining a cleanliness that is productive of the highest quality dairy products, because it is used for thorough and sanitary cleaning by all Agricultural Colleges in the United States and Canada.

Ask your supply man to fill your order.

It cleans clean.

Indian in circle in every package

THE J. B. FORD CO.,
Sole Mnfrs., Wyandotte, Mich.

COMMUNITY ORGANIZATION.

(Continued from page 310)

marketing conditions, good roads, etc. Health subjects and others of common interest may be used for general meetings.

Arrangements and programs for meetings may be under control of an Executive Committee. The program for general meetings may consist in part of entertaining features and in part of talks, papers and discussions. An intermission may be given, allowing time for committee conferences and social intermingling.

Sometimes refreshments are served which serve to "break the ice" and start friendly conversation. Outside talent may occasionally be used in these community meetings, but as one subject of this organization is to develop community talent, outside talent should not be considered essential in planning a program.

The federation of these organizations into state and national federations is commendable.

New Agriculturist Staff to Be Selected.

The staff of the 1921-22 Agriculturist is to be elected early in April. The men are to be selected from the present Junior and Sophomore classes to fill all the nineteen positions on the staff.

Gala Week Plans Are Being Perfected.

The 1921 Gala Week plans are rapidly being perfected, and the event promises to be one of the biggest reunions of Purdue grads and former students and get-together of Purdue boosters ever staged in the history of the institution.

C. W. Morey, president of the General Alumni Association, together with G. A. Ross, Alumni secretary, has been conferring with prominent Alumni and faculty members on the several important features of the occasion. President Morey praises the tentative program highly, and expects this year's Gala Week to be THE Gala Week in Purdue's history. In order to foster this idea, three thousand individual letters are being sent by the Alumni secretary.

Mistress.—"I saw you kiss the milkman this morning. In the future I shall take the milk myself."

Jane.—"It would be no use, mum. He's promised never to kiss anybody but me."—Topics of The Day Films.

"Since I commenced to use the machine my cows increased 501 pounds the first month and 525 pounds the second month over the last month I milked by hand. I believe I have made 1025 pounds more milk than I would have, had I continued to milk by hand." E. W. Eayrs.

Increase Your Production With The Perfection

DO you want to increase the production of your herd? One dairyman got an increase of over 1000 pounds in 2 months. How did he do it? He milked his cows with the Perfection Milker. Get a Perfection and increase the production from your herd.

Hand milking is not the natural way of milking. Perfection duplicates the natural action of the calf. That's why cows give more milk. Perfection can be quickly adjusted to milk each cow in the way she likes best.

It's this natural action of the Perfection that enables thousands of owners to write and tell us about their increase in milk flow. They say their cows take to Perfection from the start.

Increased production is not the only way Perfection increases dairy profits. One man with a Perfection replaces three hand milkers. It saves you the time and wages of labor. It makes you less dependent on hired help and relieves you of drudgery. Can you afford to overlook this method of milking?

Investigate Perfection Way of Milking

Send for book "What the Dairyman Wants to Know." We will also send you a list of Perfection owners names and addresses near you. Why Milk By Hand? Perfection increases production.

Perfection Manufacturing Company

426 South Clinton St.
Syracuse, New York

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Minneapolis, Minnesota

PERFECTION MILKER

TWENTY ROWS OF KERNELS TO EAR

(Continued from page 302)

Selecting the Winners.

The champion ears were picked between October 10th and November 10th. About 20,000 ears of seed were picked at this time. A few of the better ears were sorted out from each day's gathering until the time came to select my entry for the International, at which time I had 1,000 of these better ears. These ears had been stored in racks so constructed that no two ears would touch, thus allowing the corn to dry out rapidly and keeping the seed condition unimpaired. Each of these ears had 20 rows of kernels. The longest was 11 inches long and the shortest 9 inches. After looking them over carefully, I decided that I could select a sample with the most quality from those ears 10¼ inches in length. These ears averaged 20 ounces each in weight, with 1,200 kernels per ear.

I attribute my success to the following four things:

1st. I consider the strain of corn I raise to be the most highly bred in the world.

2nd. My soil which naturally was fertile had been so handled as to increase the fertility to a high degree.

3rd. The cultivation given my 1920 crop was almost ideal and much more intensive than is generally practiced.

4th. The seed from this crop was picked when it should be and was properly stored.

Government entomologists are finding difficulty in preventing the spread of the Japanese beetle. The beetle was discovered in 1916, in New Jersey. It is a dangerous pest feeding on a great variety of plants, is a rapid propagator and difficult to control.

The United States Department of Agriculture and the State of New Jersey are cooperating in an attempt to control it, there having been an appropriation of $100,000 made at the last Congress to be used in combating it. The area of infestation is so large now that it is believed impossible to entirely exterminate it. Every effort will be made to control it, and meanwhile an attempt is being made to find some natural enemies in Japan for importation.

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IS SCIENTIFICALLY MADE

Its specifications were worked out by scientists in Government laboratories. It makes a splendid display package and is used for both fruits and vegetables. Over 20,000,000 used last year.

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buy the feeding and experiment cattle for Indiana and Illinois Universities and we sell the fat and experiment cattle for Illinois, Indiana, Missouri and Ohio Universities.

These great State Universities have experimented and proved for you that the salesmanship and service of Alexander, Conover & Martin, is a fitting crown to your efforts to make the most money out of your Live Stock.

Consider well this important fact and let us handle your next shipment.

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(HOG FOOD)

Manufactured in accordance with the Indiana Feeding Stuffs Control Law—Guaranteed to contain not less than 60% Protein, 6% Fat. Is recognized as one of the leading brands on the market and a very profitable article when fed at any season throughout the year. A trial will convince you of its merits.

Insist on obtaining "KINGAN'S" Digester Tankage of your dealer.

KINGAN & CO. LTD.

BEEF AND PORK PACKERS,
INDIANAPOLIS, IND.

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Mid-West Crushed Stone Quarries Co.

AGRICULTURAL LIMESTONE

SOIL SWEETENER ACID REMOVER

THE FARMER'S BEST FRIEND

Our Price is Right
Our Product is Right

Our Shipments are Right
Box and Open Top Cars

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We Are Never Too Busy
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SHOE REPAIRING
Come in! We'll give you—
A QUALITY JOB
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UNIVERSITY OF ILLINOIS LIBRARY
MAY 3

MAY, 1921

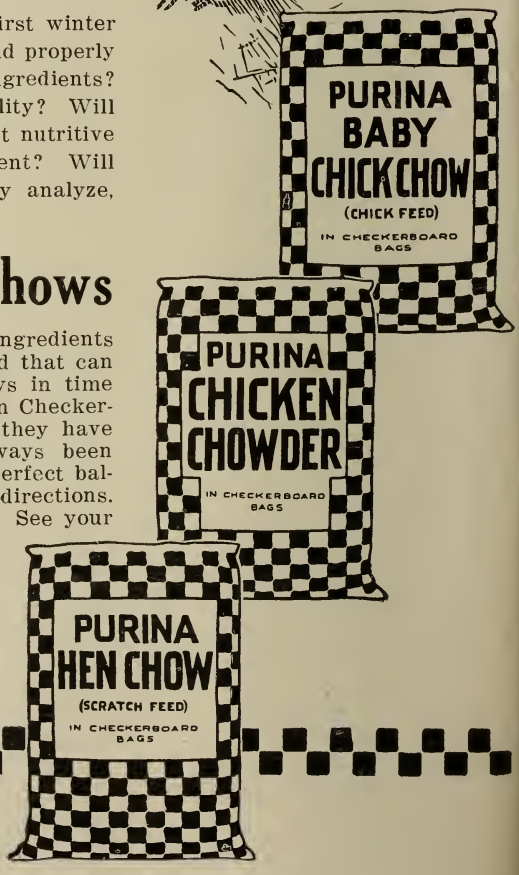
Vol. 15 No. 8

A Layer Next Winter!

OF course your chicks will lay the first winter if they are fed a balanced ration and properly cared for. But how about getting the ingredients? Can you always be sure about the quality? Will they be up to standard and of the right nutritive value? How about the moisture content? Will you always have the time to properly analyze, proportion and mix them?

Purina Poultry Chows

Laboratory-tested, scientifically mixed ingredients of the highest quality are the only kind that can back up the Purina Guarantee. It pays in time and money to buy your poultry ration in Checkerboard Bags. Regardless of what test they have been put to, Purina Chows have always been found to be of uniform quality and in perfect balance. Your time is worth more in other directions. Let the Purina Mills mix your rations. See your dealer today. If he can't supply you write us direct mentioning his name and the number of chickens you have.



RALSTON PURINA COMPANY

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Ft. Worth, Tex. Nashville, Tenn. Buffalo, N. Y.

Feed from Checkerboard Bags

What Is Research?

SUPPOSE that a stove burns too much coal for the amount of heat that it radiates. The manufacturer hires a man familiar with the principles of combustion and heat radiation to make experiments which will indicate desirable changes in design. The stove selected as the most efficient is the result of research.

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Suppose, as you melted up your chemicals to produce rubies and experimented with high temperatures, you began to wonder how hot the earth must have been millions of years ago when rubies were first crystallized, and what were the forces at play that made this planet what it is. You begin an investigation that leads you far from rubies and causes you to formulate theories to explain how the earth, and, for that matter, how the whole solar system was created. That would be research of a still different type—pioneering into the unknown to satisfy an insatiable curiosity.

Research of all three types is conducted in the Laboratories of the General Electric Company. But it is the third type of research—pioneering into the unknown—that means most, in the long run, even though it is undertaken with no practical benefit in view.

At the present time, for example, the Research Laboratories of the General Electric Company are exploring matter with X-rays in order to discover not only how the atoms in different substances are arranged but how the atoms themselves are built up. The more you know about a substance, the more you can do with it. Some day this X-ray work will enable scientists to answer more definitely than they can now the question: Why is iron magnetic? And then the electrical industry will take a great step forward, and more real progress will be made in five years than can be made in a century of experimenting with existing electrical apparatus.

You can add wings and stories to an old house. But to build a new house, you must begin with the foundation.

General Electric

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DOWN where Schumacher is a much cheaper feed than ground corn or oats, middlings or bran—

DOWN to a point where you cannot afford to miss the BIG SAVING today's prices give you on a feed that has

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MORE food value than oats.
MORE food value than wheat feeds.
MORE food value than brewer's grains.

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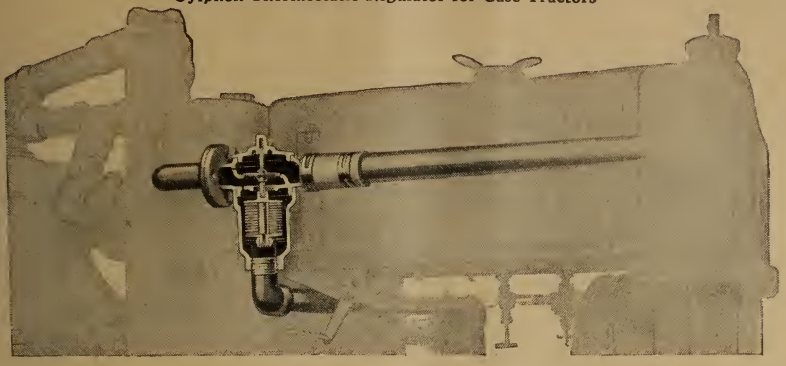
The Quaker Oats Company **Address: Chicago, U.S.A.**

Sylphon Thermostatic Regulator for Case Tractors



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FEED UP!

EVERY dairyman knows that he must feed proportionately for the light summer period, as well as in the heavy winter months, if he wants a large flow of milk from his herd when he can sell it at a good price.

Here is the way it works out:

Suppose your price for milk is $1.90—with an almost certain prospect of being lower when grass comes, and pastures are good.

Now, if you feed Buffalo Corn Gluten Feed mixture at a cost of about $30.00, you can produce at least $130.00 worth of milk from your good milkers.

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Corn Products Refining Co.
New York Chicago

FREE Write for full information giving the correct mixture for feeding Buffalo Corn Gluten Feed. If your dealer cannot supply you with Buffalo Corn Gluten Feed, tell us who and where he is. Write today to Corn Products Refining Company, Feed Department, 17 Battery Place, New York City.

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Entered as second class mail matter December 4, 1906, at the Post Office, LaFayette, Ind., under the Act of Congress of March 3, 1879.

Subscription Price One Dollar Per Year. **Advertising rates sent on application.**

The premier sire of the Hereford world, Perfection Fairfax.

The Purdue Agriculturist

VOLUME XIV MAY, 1921 NUMBER 8

An Ideal Farm Home

By Mrs. Chas. B. Sewell,
Well Known Writer and Institute Lecturer.

YEARS ago the prophet declared, "My people perish unless they have a vision." Without an ideal, one never reaches the summit of his possibilities. In the mind of the architect, the finished structure exists, from foundation to pinnacle. The mother caring for her helpless babe, in the long hours of the night, looks forward to the days of the child's maturity; to years of usefulness; to positions of honor; to days when it shall share and relieve her of her burdens. The sower sees in the planted field a golden harvest. Just so with our homes.

"The husband must be a home-maker and the wife a home-keeper, partners in sorrow and losses, as well as in profits and pleasures. They must not be afraid of work and must be willing if necessary, to begin where parents began, not where their rich grandparents left off."

Next Month:—Report of Annual Steer Feeding Experiment.

We have many definitions of the mere word—"home." Webster says "it is the place of one's abode." The small boy said, "It's the place where a feller's ma is," while Abe Martin recently said, speaking of some homes, in town or city, "It's a sort of a filling station, where folks rush in to eat and drink between movie shows." Anyone of these groups of words may describe certain homes, but we feel that they fall short of our ideal. The poet says,

"The men of earth build houses,
Walls and roofs and domes,
But the women of the earth,
God knows,
The women build the homes."

The first requisite for an ideal farm home is two people who really love the country. No one can succeed in home, business or social life unless they are contented and happy in their surroundings. Some prefer the noise and roar of traffic to the quiet of the farm; a sunset painted on a canvas instead of the glorious coloring of God's out-of-doors. And these will rarely, if ever, be contented in farm homes.

The husband must be a home-maker and the wife a home-keeper, partners in sorrows and losses, as well as in profits and pleasures. They must not be afraid of work, and must be willing, if necessary, to begin where parents began, not where their rich grandparents left off. They must realize, that the spending of money is as important as the earning of it. That each has the same motive for making things go well, and each should share, equally, in the earning and in the spending.

The ideal farm home should be planned for comfort and convenience, rather than costly furnishings. As fast as there is money in the family pocketbook, to afford them, water, heating and lighting systems must be added. Sometimes, in an old house, the changing of position of a window or door, the rebuilding of a chimney or removal of a partition will work wonders, at a surprisingly small outlay of money. Statistics show that girls and young women are leaving the farms and rural places in larger numbers than are the young men. Many become dissatisfied with small, inconvenient homes, lack of privacy and monotonous routine, with much of work and little of play. Let us add every convenience and comfort we can, while the children are still all in the home nest, for after they are gone, we neither care for or need them, so badly.

Make the home the social center for every member of the family. Provide plenty of books, periodicals, games and music of the right sort. Take time from the regular duties to play with the children, and to be the companion of your husband. Much of the unrest of the day will find its solution beneath the roofs of our American farm homes. Herbert Hoover has said, "The farms have always provided our country with its source of true Americanism; its fresh strength and moral vigor."

Some people feel that an ideal home on the farm is impossible today, with the scarcity of help, low prices and the great amount of hard work to be done. True there is much hard work, that cannot be done on paper; but careful planning, skillful management and plenty of labor-saving devices will modify the unpleasantness to a large degree. The pure air, the wholesome food, and good water may be ours for the asking. The freedom of restraint, the removal from the noise and hurry of the city, are blessings, that must not be lightly estimated. Henry W. Brady once declared, "The homes of the people—let us keep them free and independent and all will be well with the Republic. There is a lesson our foes may learn. There is a work, the humblest and weakest hands may do. In thrift and industry let us make them self-sustaining; in sacrifice and self-denial let us keep them free from debt and obligation. Above all let us honor God in our homes—build His altars above our hearthstones—anchor them safe in His love. What the *home is*—this and nothing else, will our government be."

Homelike, Cozy and Attractive

Our legislature has recently passed a pure seed law which should prove of much value to purchasers of seed. It requires that seed be labeled, giving the common name, and stating the amount of foreign seed therein and the per cent germination of the seed. It will be some bother to the men who did not care what kind of seed they sold, but will be worth all the trouble it takes in labeling in increased profits by the man who grows the seed purchased.

The United States Court has at last reached a decision on the federal farm loan act and by a vote of 6 to 2, decided it to be constitutional. It is indeed fortunate that this matter has at last been cleared up so that farmers can again make use of it.

History of Perfection Fairfax

By S. S. Little, '21.

On account of the career of Perfection Fairfax should be of special interest to residents of the Hoosier State because both his insignificant early career and his later illustrious one were spent in Indiana. His ancestry also, for generations back, were closely identified with early Hereford breeding establishments in Indiana.

Perfection, 92891, the sire of Perfection Fairfax, was calved in 1898 and bred by F. A. Nave, of Attica, Ind. Perfection was sired by Dale, champion in many shows, and out of Melley May, a daughter of Hoosier Tom, by Anxiety 2d. Going back five generations on the line of sires we have Dale, bred by Clem Graves, Bunker Hill, Indiana, Columbus and Earl of Shadeland, of the Shadeland Farms, Lafayette, Ind. This was a remarkable ancestry.

Mr. A. C. Huxley, of Bunker Hill, Ind, bought the imported cow, Berna, in calf to Perfection at the Hoxier sale at Thorntown, Ill., May 14, 1903, for $365. Berna was a daughter of Fairfax, owned by W. T. McCray, of Kentland, Ind., and also carried Woodford and Beau Donald blood in her veins. This mating of Perfection and imp. Berna certainly brought together two strains of the "bluest blood" of the Hereford breed and Mr. Huxley had a right to expect something particularly choice. The calf arrived October first and was about as disappointing a prospect as could be imagined. He was a disgusting light yellow-red, a color that has always been tabooed by Hereford breeders. His legs were crooked and his whole conformation altogether unpromising.

Shortly afterward, Mr. Huxley had a visit from Mr. E. W. Furbush, a piano manufacturer of Boston, Mass., who had a farm at Freedom, N. H. He was a reader of the "Breeders' Gazette" and became an admirer of good Herefords. He arranged to visit Mr. Huxley's farm, desiring to secure a cow with a bull calf at foot. The proprietor offered to trade imp. Berna and the bull calf for a $500 piano, but the visitor replied that he would not have a cow on his farm that would not produce a better calf than that. Mr. Furbush was not alone in having a poor opinion of the calf at this time.

Huxley was expecting to show a full herd at the fairs of 1904 and had two other bull calves that were receiving extra attention with a view towards exhibition. Meantime Perfection Fairfax was running around with the other calves on the place quite neglected. As time passed, however, Huxley and Pierce, the herdsman, engaged in arguments as to which of the two bull calves in preparation was the better, and finally Pierce remarked, "If you will get another nurse cow, I'll just take the yellow calf and beat all the others." The nurse was finally procured and under the stimulus of this additional milk the young bull began spread-out out into fine form. Best of all, in the spring as he was shedding his coat, lo and behold, he was a fine rich red. This was of course a very welcome surprise to the owner. From that time there was never much question as to his destiny.

At the fall fairs of 1904, Perfection Fairfax was probably the heaviest calf in his class. At the International his official weight was 1220 pounds. This is certainly remarkable in view of the late start he had. At the Kansas City Royal of 1905, just as Mr. Huxley was leading Perfection Fairfax out of the ring with the purple badge that meant Junior Championship of the show, friend Furbush came up and congratulated him upon the winning and his surprise can better be imagined than described when told that this was the calf that he had said was too poor to have around his New England farm. Mr. Huxley was offered $2,000 for Perfection as a calf and $3,000 as a yearling; he declined both propositions. Out of a possible thirty-one first prizes shown for as calf, yearling and aged bull he won thirty firsts and one second. As a two-year-old he was not shown. Mr. Huxley having disposed of Beau Donald 33rd, his chief stock bull at that time, could not spare Perfection Fairfax from the breeding herd. Messrs. Harris, Curtice, and McCray, at this time were all trying to secure Perfection Fairfax from Mr. Huxley. Only after Mr. Huxley decided to close out his herd did Mr. McCray secure him by buying the whole of Mr. Huxley's herd.

(Continued on page 376)

How Club Work Changes Farm Practices

By F. M. Shanklin,
Assistant State Leader, Boys' and Girls' Club Work.

THERE has been some confusion about what club work among boys and girls attempts to teach. Most of the criticism comes from those who share this confusion. The U. S. Department of Agriculture and those looking after the work in Indiana believe it should be regarded as a demonstration of better farm practices. They recognize its educational and social possibilities, but do not believe our boys and girls are developing experimental data or furnishing complete and accurate records of cost in production.

The effect of club work upon farm practice could be cited in a large number of instances. In some of these the testing of seed corn for disease and vitality has become the farm practice because the boy showed the way. Better seed in corn and potatoes is the general rule where such clubs have been organized. Many farmers have discarded the grade hogs for purebreds, have secured better beef and dairy cattle, have changed the feeding methods and in many other ways have responded to the effect of demonstration on the home farm conducted under the club rules and club leaders by boys and girls.

Chester Allen Jones, of Lebanon, may be used as a concrete example of the effect of such a demonstration. This boy became a member of the Boone County Guernsey Club when it was formed and took home an imported Guernsey calf that is still in his possession. When a second importation of calves was made and Boone county received another lot, Katherine, a younger sister, added the second fine heifer calf to the Jones farm. Up to this time the father, Mr. William Jones, did a general farming business and had not felt any necessity for special equipment in his barn for dairy cattle. The old barn was good enough for the family cow. When, however, the children went into the dairy calf club and the dairy interests of this household took on new life, the old barn did not harmonize with the new ideas. After a year or so Mr. Jones decided there might be a better way to

Chester Jones and his partner in his Guernsey business.

(Continued on page 374)

Evansville Adjusts Price of Milk

By L. F. Neff, '22.

WHAT is a fair price for milk? This question confronts every American community, yet few have answered it fairly. This fair price difficulty has caused costly milk strikes and spiteful boycotts instead of durable adjustments. What is the cause of this distressing problem? Just this, that people generally have not become acquainted with the factors that control the price of milk. They have felt injustice without knowing exactly the source nor the verity of the injustice. Naturally there have been quarrels between the consumer, distributor and producer. To gain a needed raise in the price, the farmer called strikes and withheld his product from the public. To lower the price the consumer boycotted milk while the distributor, like the monkey dividing the cheese between the two thieving mice, nibbled first from one side of the balance and then the other to his satisfaction, but to the great dismay of the others. Such was the state of affairs in Evansville, Indiana, in the fall of 1918. But the World War was on. The current appeal to patriotism as a stimulant to unlimited food production demanded a peaceful settlement of this price bug-bear. These dairymen adjusted their difficulties without a strike, and this is how they did it.

It is not surprising to hear that a compromise between dairymen and dealers resulted in mutual sympathy, but it is worth reading how such an agreement led directly to improving a county's health. How did Evansville solve this problem?

Under the direction of Mr. B. F. Persons, County Food Administrator, a conference, a sort of "get-together and say-what-you-think meeting," was held between the producers and distributors. There, in that more intimate relation than had ever before been known between dairymen and dealers, a new feeling was born which was to solve the problem of milk-prices for Evansville. Right there each began to appreciate the reality of the problems of the other. This understanding fostered sympathy and willingness to reason so that they agreed to submit the actual price adjustment to a milk committee to be composed of two consumers, two dairymen, and two distributors, in addition to the County Food Administrator who acts as chairman. This committee actually did set a price but that was not the real result of their efforts, for that price arrangement has since been altered. The great gain was the co-operative habit and the ability to see clearly the actual state of affairs and to submit difficulties to a common settlement.

The actual adjustment formulated by the committee was based on the feed cost, labor required, management and risk taken in order to produce 100 pounds of 4 per cent milk. The requirements for this amount were based on data obtained in Cow Testing Associations and were found to be on the average: 20 lbs. of corn; 20 lbs. of manufactured feed; 48 lbs. of hay; 150 lbs. of silage; 20 lbs. of corn stover; 20 lbs. of straw; 3 hrs. of labor, and 10 per cent of this total value to cover the cost of management and risk. The latest local market values were used for all feeds except manufactured feeds, in which case the market values at Louisville and St. Louis were also used. To encourage a readjustment in the surplus and shortage in the milk supply, the final price was varied from the average as determined by the above method by applying the following percentage factors for each month:

January	110%	July	85%
February	100%	August	100%
March	105%	September	105%
April	95%	October	112%
May	80%	November	115%
June	80%	December	113%

The final figure so determined about the middle of each month was used as the price per 100 lbs. of 4 per cent milk.

This method was used for one year. It worked well enough excepting for the spring months, when the rapid fluctuations in feed prices prevented their use as a basis for milk prices. So they formulated a price

standard on a butterfat basis in this way: multiply the average price paid for butterfat in cream during the thirty days preceding the 20th of each month by 4; add the market value of 30 lbs. of shorts and 40 cents per 100 lbs. for the extra work required to produce market milk. Now divide the sum by 4 and let the resulting figure be the price of fat in all milk up to 4 per cent. For fat above 4 per cent pay the average price for butterfat in cream. Then to provide for the surplus and shortage of milk, 15 cents was added to this price during January, February, March, October, November and December; 10 cents was added for August and September; 20 cents was subtracted during April and July; 30 cents was subtracted during May and June.

After a few months trial it was evident that this system did not pay enough for butterfat during the spring months when feed prices were still high. The committee next decided to combine both methods of estimating the price of milk. That is, the price was to be determined on the cost of production basis and also on the butterfat basis; if the two results varied more than 8 cents, the average of the two prices was taken as the price for that month. In case the difference was less than 8 cents, the price as determined on the butterfat basis was taken as the final price.

This method gave satisfaction even during the trying months of 1920 when violent price fluctuations were frequent, so that this community now has a satisfactory price fixing system for milk. This has not been the only result of their co-operative efforts, however. While working on the price of milk, it was found that Evansville people were not using enough milk to insure their general health. An educational campaign, supported by the combined resources and efforts of the distributors and producers, was launched to correct this low consumption. As a result of the vigorous boost obtained from a wider knowledge of the truly wonderful qualities of milk as a food, its consumption in Evansville was increased 10 per cent. Where before there was ignorance as to the health-giving power of milk and distrust of the aims of the dealer and farmer, there is now an appreciation of milk and a new faith in the justice of an arbitrative settlement of milk-price disputes. This is a fruitful result of co-operation.

Display in window of grocery store at Evansville during milk campaign.

Money may not talk so loudly in a bank, but it will talk longer.

Common Insects Following Sod, With Methods of Eradication and Control

By I. H. Swaim, '22.

SEVERAL of our worst insect pests normally live in grass lands and when the sod is broken up feed upon the succeeding crop if it is of an allied nature, corn especially being attacked. These insects may not noticeably damage the sod, but when it is turned under and the land planted to corn the same number of insects must exist on a greatly reduced food supply and consequently the damage may be great. Our most injurious pests coming under this classification are the cutworms, white grubs, wireworms, the corn bill bugs and the corn root web worms.

In general farm operations these insects must be constantly fought. The practical way to do this is to use a preventative method rather than to wait for the attack and then attempt to remedy the trouble, for several of these destructive pests cannot be controlled once the crop is infested. In order to plan our crops and farm operations to avoid these pests we must know the life history and habits of the insects likely to be encountered.

First, let us remember that white grubs and wireworms are underground insects feeding entirely on the roots, that the cutworms and webworms are concealed in the soil the greater part of the time and cut off or injure the plant near the surface, and that bill bugs are usually concealed during the day and attack the unfolding leaves at night.

The Cutworm.—The adult of the cutworm is a moth which lays her eggs in grass lands in late summer. The newly hatched larvae feed on the grass shoots near the surface until cold weather forces them into hibernation, by which time they are half grown. The reason cutworms are so destructive in early spring is because they are only partly grown and at a stage when growth and consequently feeding is most vigorous. By the latter part of June the cutworms complete their growth and pupate. In spite of the fact that the feeding period is relatively short, the losses from cutworm injury is a large annual item in the expenses of the farm.

Poison baits can be used against this insect with good results, but often a little foresight will enable the grower to plan his crops and practices to avoid cutworm trouble. The life history of the insect suggests several good preventative measures which can be used to advantage. Thus, a rotation, planting in new ground a crop not susceptible to cutworm injury, such as potatoes in place of corn, is an advantage in so far as cutworm trouble is concerned. Since the eggs are laid in grass land in early fall, an infestation which might otherwise result in damage, can be avoided by plowing the sod in early fall to remove the favorable conditions for egg laying.

Poisoned bait, mentioned above as an effective cutworm bait is prepared as follows:

Heavy grade of black strap molasses 2 qts.
Bran ..... 25 lbs.
Poison—Paris Green ..... ½ lb.

(If white arsenic is used, ¾ pound is necessary, and if crude arsenic, use 1½ pounds).

Mix the bran and poison thoroughly and then add the molasses which has been previously diluted with several times its quantity of water. Mix thoroughly. The mass should be damp but not soppy. Apply thinly along rows or broadcast at the rate of 10 pounds per acre. Apply in the evening, as the cutworms feed at night. (For grasshoppers the same bait is used but is applied in the morning).

White Grubs.—White grubs or "grubworms" are the young of the brown May beetles which frequently are abundant at lights in the spring of the year. They may become a very serious pest to corn, strawberries or potatoes following sod, sometimes even resulting in a complete loss of the crop. They have a three-year life cycle but do little damage the first year. The greatest damage is done the second year when the grub is of fair size and the feeding period extends from the middle of May to the first of October. The feeding period of the third summer extends only from the middle of May to the first of July, when the grub transforms to a pupa.

The life history of this insect suggests a method of control. As the larvae spend

the winter in the ground, fall plowing can be practiced as a control measure provided the plowing is done at the proper time, preferably between October 1-15. After the middle of October a great many of the grubs will have burrowed to a depth of from ten to fourteen inches below the surface to establish their winter quarters and would not therefore be turned out and exposed to the winter weather. Right in this connection we might say that a flock of chickens or turkeys following the plow will materially reduce the numbers of this pest. Where it is practical to turn hogs into an infested area it should be done by all means, as they are very fond of white grubs and will soon clean out quite a serious infestation. This should be done in the fall before the grubs go to their winter quarters or in the spring after they have returned to near the surface. Last but not least, we should practice systematic crop rotation. If a field is known to be badly infested with white grubs it should never be planted immediately to corn or potatoes which the grubs readily attack, but instead a crop of buckwheat or some other crop which is not readily attacked should first be planted and harvested or the field should be cleared of grubs by pasturing hogs as mentioned above.

Wireworms.—Wireworms, the adults of which are the common click beetles, have a life history similar to that of the white grub in so far as they live the most of their life cycle underground and are common sod ground insects. Fall plowing, crop rotation and the utilization of hogs and poultry are of value against wireworms similarly as against white grubs.

Most wireworms are low-ground infesting species and the more important kinds in the southern half of the state are to be found in poorly drained and heavy soils. As a rule, proper liming and thorough drainage of the ground will in a few years eliminate wireworm trouble.

Corn Bill Bugs.—This insect is to be found infesting low swampy lands that have been in sod or wild grass for some time. Although they are found feeding in both the adult and larval stages the damage by the beetles is the more common. They puncture and riddle the unfolding leaves of young corn, killing the main stalk and causing the plant to tiller and remain stunted throughout the season. A serious infestation of this pest would likely mean the loss of the majority of a corn crop despite the fact that their feeding period only extends over the spring and early summer months. No steps can be taken in the spring to arrest corn bill bug injury to the crop, but fall plowing and subsequent clean cultivation is of value. Crop rotations in which some crop other than corn is grown in infested ground is desirable. Drainage as for wireworms together with clean cultivation is the most effective method of control.

Corn Root Web Worm.—Instead of having a life history extending over a period of years as do the white grubs and wireworms, this pest produces two generations a year. The eggs of the first brood are laid in grass lands during May and June. This generation completes its life cycle by the last of September or the first of October at which time the eggs are laid for the second generation. The larvae of this generation become half grown by the time cold weather sets in and spends the winter in a silken lined tube which it makes among the plant roots. It is active in early spring feeding until it becomes full grown when the usual transformation takes place and the adult moth issues to lay eggs for another generation.

As is the case with other pests normally living in grass lands, fall plowing is recommended. Early fall plowing will destroy favorable egg laying conditions and later fall plowing will break up the winter quarters of the insects. If fall plowing is not possible, then spring plowing should be done during the latter part of May to effectually control this pest. Plowing earlier than this will allow the young larvae to survive and attack the crop while later plowings will give the larvae a chance to mature and the issuing moths an opportunity to lay eggs in the grass lands for the summer generation. Crop rotations are also very effective, as this pest confines its attacks largely to sod and corn.

Many farmers think of fall plowing as principally beneficial from a cultural standpoint and the value of fall plowing as an insect control measure is disregarded. As a matter of fact fall plowing is a very important item in insect control and particularly for the control of several pests which could not be easily held in check by other methods.

Prospects for the Swine Breeder

By C. R. Beard, '22.

"HE who maintains his herd through the present crisis will be in a strong position," is a statement made by Prof. Herbert W. Mumford of Illinois University, who is a well known breeder and exhibitor of Duroc Jersey swine. Professor Mumford, in an article in the Duroc Bulletin, gives this as his opinion regarding the future of the swine breeder. He goes on to say that the condition of the breeders of pure-bred live stock at the present time is critical, and that, "to bridge the present crisis will require level heads, courageous hearts, and almost infinite wisdom."

Farmers have cut down their number of brood sows 25 to 50 per cent. This will cause a shortage of pork hogs on the market next year, and the shortage will naturally cause an increase in price. Then when prices become more stable, the farmers will want more breeding stock, and will come to the pure-bred breeder to buy it.

The old story of the "in and out" buyer will repeat itself. The "in and out" buyer is generally "in" when he should be "out," and "out" when he should be "in." Thus the farmers got scared when hog prices began to drop, and marketed their brood sows at a low price. Now when the scarcity of hogs becomes evident and the market assumes a more active tone, these same farmers will be purchasing other brood sows at a higher price, and it will be practically a year before they will have their usual number of hogs to sell.

A period of under-production is following a period of over-production. The law of supply and demand will soon assert itself and pork will be produced at a profit from the abundant corn crop of the last year. This will establish the pure-bred business on a normally profitable and sound basis, because the success of the pure-bred business depends fundamentally on the profitable production of meat hogs. No one need expect that war prices are going to return, but hog prices will necessarily be higher.

The man who breeds this kind need not worry about the future.

The breeders are well supplied with hogs, but the feeders are not. There is an abundance of farm crops, a large portion of which must be marketed through hogs. This assures the breeder of an outlet for his surplus stock.

(Continued on page 372)

VALUE OF EGG SHOW

THE lack of uniformity in market eggs from Indiana farms is one of the things detrimental to the poultry business which the Purdue Egg Show given at Lafayette, Indiana, May 2, 3, 4, 5, purposes to remedy. The farmer learns by visiting the show, or by making an entry in the show, how to improve the quality of his market eggs by making them more uniform. The average farmer, upon hearing of an egg show often wonders what the value of such a show can be to him in suggesting better methods of management of his own flock. To one who has never attempted to select eggs for display in a show, the problem seem easy, for not until a close examination and study of eggs is made in an endeavor to select twelve eggs of the same size, shape, and color, does one sense the difficulty of the task.

The reason for such difficulty lies chiefly in the fact that no particular attention is paid to the selection of eggs to be used in producing the laying stock on the average farm. The importance of this can not be over-emphasized. The farmers must realize the importance of uniformity in their products before they may expect to command the highest prices for their products. There are other factors which enter into the determination of the value of eggs, but probably none of them are so ignored as is the question of uniformity.

Uniform eggs may be secured by careful selection and breeding of the laying stock. It is a fact that a pullet lays an egg similar to the one from which she was hatched. Uniformity pays. During October and November, 1920, the Purdue poultry farm received a net profit on eggs shipped to New York of about 25 cents a dozen—more than the average paid to Lafayette producers during the same period. This was due to the fact that the eastern market demands uniformity in eggs, and will pay a premium for it.

Eastern producers market more uniform eggs than do Indiana producers. This partly accounts for the fact that New York has a greater income from poultry products, and has more valuable stock than does Indiana, despite the fact that Indiana producers have the greater number of fowls.

In the 1910 census, Indiana ranked sixth in numbers kept, having 13,789,109 chickens, and New York ranked tenth, with 10,678,836 chickens. In value of products, however, New York ranked fifth, with $7,879,000, and Indiana was sixth, with $7,762,000. New York led Indiana in amount of income from poultry products, totaling $15,161,114, while Indiana had $14,635,464 in products. This difference is due largely to the superiority of the eastern products in uniformity of eggs.

HOUSEHOLD CONVENIENCES.

When statistics show that more automobiles are in use in our rural communities than kitchen sinks, it would seem that the plea for more and better equipment in the woman's workshop is a timely one. A business man, whether he be a banker, a merchant, a farmer or a physician, considers that he cannot afford to use poor equipment—his time is too valuable.

The housewives are beginning to appreciate the fact that they are business women with a twofold occupation, that of housekeeping and homemaking. If the housewife must spend a large part of her time carrying water in and out of the house, in using dull paring knives, broken egg beaters, and other "labor makers," she has no time nor energy left for "homemaking" and the whole family must pay the price.

A business man can measure his success in terms of dollars and cents. If he has managed his business wisely and well, his bank account tells the story. Not so in case of the efficient housekeeper, but he has a measuring stick that should mean more to the world than that of the business man, for she should measure her success in terms of a happier home and a more contented family. She can not do this if she does not have a well equipped workshop. Her time is valuable also, and she cannot afford to waste one hour of it.

The Home Economics Federation in Tipton county, working with the home demonstration agent, Miss Orpha Cole, planned a Household Convenience Drive for the holiday season. Each member was asked to pledge that she would secure at least one new household convenience and induce one non-member to do the same. Their plan was to reach several hundred women in the drive.

MODERNIZING THE FARM HOME

Bacteria as a Factor in Soil Fertility

By I. L. Baldwin, '19,
Instructor in the Bacteriology Dept.

PROBABLY the most important phase of crop production, confronting the corn belt farmer, is the maintenance of soil fertility. As crop after crop is removed from the land, its native fertility is lowered to such an extent that it will no longer produce the bountiful crops that it formerly did. The problem then confronting every crop producer is the maintenance or improvement of the soil fertility.

Soil fertility is dependent upon or influenced by three sets of factors: chemical, physical and biological. The first two of these, chemical and physical, have been recognized and studied for a number of years, but the relationship existing between the biological conditions and soil fertility is a relatively new field of study. While it is generally known that the soil contains millions of microscopic plants known as bacteria, and that they have a great deal to do with soil fertility, there is still much haziness about the subject in the mind of the average farmer.

Bacteria and the Transformation of Plant Food.

Most soils contain a great excess of plant food, but the limiting factor lies in the fact that very little of it is soluble or available. The problem of soil fertility very often develops into a problem of transforming these insoluble materials into soluble plant food. This liberation and transformation of plant food is very largely a matter of bacterial action, and it is here that the biological factor in soil fertility assumes the most importance. In this process the bacteria attack both the organic and mineral elements in the soil, reducing them to simpler compounds and making them soluble and available for plant nutrition.

Nitrogen Transformation.

Nitrogen is the element most often lacking in soils and it is about this element that the most valuable bacterial activities are centered. Nitrogen to be utilized by plants must be in the form of nitrate, and in this form it is very readily soluble and is leached from the soil easily. Therefore, if plants are to be adequately nourished, they must be furnished with a continuously replenished supply of nitrates. Nitrates are produced in the soil by the breaking down or decay, through bacterial action, of the complex protein materials such as the crop residues and manures. These materials are first broken down into the dark material known as humus and this humus is then further broken down into ammonia, which is oxidized to nitrates. Each of these steps is accomplished by a particular type of bacteria and in many cases the particular bacteria is so specialized that it can do no other work. Since these bacteria are constantly at work, providing conditions are at all favorable, we have a continuous supply of nitrates furnished for plant nutrition.

Nitrogen Fixation.

In addition to transforming the unavailable protein nitrogen into the available nitrate nitrogen, bacteria carry on another highly useful piece of work in the gathering or fixing of free nitrogen. While nitrogen is present only in limited amounts in the soil we find that the air is composed of about four-fifths nitrogen. The nitrogen of the air, however, is the free, uncombined gas and as such is of no value as a plant nutrient. There are certain bacteria, however, which are able to utilize this free nitrogen of the air as a food and in so doing they gather it into combination with other elements or "fix" it. This nitrogen then becomes available for plant nutrition.

There are two general types of organisms concerned in nitrogen fixation. One of these works only in connection with or on the roots of the legume plants, while the other works in the upper layers of the soil independently of any plant. Both types are able to fix relatively large amounts of nitrogen.

Legumes and Nitrogen Fixation.

Intelligent farmers for many years back have known that the legumes seemed to enrich the soil, but it has only been recently that the reason for this was discovered. On the roots of the legume plant we find a number of small protuberances or nodules. These nodules are filled with the nitrogen fixing bacteria and because of the nitrogen taken from the air and fixed by this bacteria

the legume grows strong and sturdy on rather weak soils. One interesting factor in connection with the legume bacteria is their inability to develop on any other legume than the particular one to which they may be adapted. The same organism will grow and develop on alfalfa and sweet clover, but it takes a different type to grow and develop on the red or crimson clover and still a different type is demanded by cowpeas.

Not only do the legumes enable these bacteria to grow and to gather nitrogen from the air, but the bacteria in turn help the legumes by supplying them with available nitrogen. So dependent are the legumes on this help that they will not develop to the best advantage unless their particular type of legume bacteria are present. It is highly desirable therefore to be certain that the proper type of bacteria are present when growing any legume. If the particular legume in question has never been grown in the immediate vicinity it is advisable to inoculate the soil with that particular organism. This may be accomplished either by transferring some soil from a field already growing that legume or by means of pure cultures of the organisms. These pure cultures, with full directions for use, may be secured from the U. S. Department of Agriculture, or from any one of a number of commercial concerns.

Independent Nitrogen Fixation.

The nitrogen fixing organisms which live independently of any plant are found in practically all soils. They will not develop in a soil which is acid nor will they develop in a soil which is not well aerated. In their work of fixing free nitrogen they use up large amounts of organic matter as food, and this must be supplied to them if any appreciable amount of nitrogen is to be fixed.

Denitrification.

Another type of organisms found, which are not helpful, are the denitrifiers. These organisms take the nitrates and other nitrogen compounds and break them up, liberating the free nitrogen and thus undoing the work of the nitrogen fixing bacteria. Fortunately, however, these organisms work to best advantage under soil conditions which are exactly the opposite of those demanded by good soil management. They work best in poorly aerated, water logged, acid soils. If the soil is kept sweet, loose and well drained there is little to fear from these organisms.

Bacterial Activities and the Mineral Constituents.

When the soil organisms break down or decay the organic materials in the soil, they produce among other things vast amounts of carbon dioxide and various organic acids. These organic acids and carbon dioxide in combination with water have the power of attacking the various insoluble mineral elements such as potassium and phosphorus and render them soluble and available for plant nutrition. Here again we have the bacteria indirectly preparing the soil constituents for plant nutrition.

Conditions Affecting Bacteria in the Soil.

Having discussed some of the activities of the soil bacteria, let us now see what factors affect bacterial growth in the soil. The most important conditions affecting bacterial activity in the soil are moisture supply, food supply, aeration, reaction and temperature.

Bacteria, the same as other plants, require an adequate moisture and food supply. As a food supply they utilize in the main the organic matter derived from manures and crop residues. In addition to this certain of them, as we have seen, are able to utilize the free nitrogen of the air as food. Also they utilize small amounts of the mineral constituents of the soil as food.

Bacteria are divided into two classes with respect to their behavior toward oxygen. Most of them must have free oxygen in which to live and develop. On the other hand, some of them will not develop in the presence of free oxygen but must live in absence of it. However, by far the greater portion of beneficial soil bacteria require an abundant supply of free oxygen. Since the oxygen is carried into the soil by the air, it means that the soil must be loose and well aerated to provide the best conditions of growth. The denitrifiers, which we mentioned above as detrimental types of soil bacteria, work to the best advantage in the absence of oxygen. Therefore, a tight, water-logged soil favors their development.

Bacteria are very sensitive to the reaction of the soil. Practically all of the helpful ones demand a neutral to basic re-

(Continued on page 372)

Corn Judging Schools in Indiana

By E. L. Austin,
Assistant State Club Leader.

THE Boys' Corn Club was one of the first clubs to be organized in Indiana. As early as 1905 work was begun under the direction of the Superintendent of Agricultural Extension at Purdue. In 1912 the Club Division was created to take care of a rapidly growing demand for an extended state club program.

Some special phases of club work have developed as a natural outgrowth of the older clubs. One of these is the Corn Judging School. The idea originated with Mr. F. L. Kem, formerly of the Club Division staff. Under his plan the local leaders in any community got the corn club members and members of the vocational agricultural classes together and gave them some intensive coaching on corn judging. This consisted of scoring single ears, placing ten ear samples in order of merit, and an oral or written quiz over the points of the score card or on corn culture.

After a county had made some preparation, a member of the Club Division visited that county to conduct a corn elimination contest and give instruction in corn work. He carried samples of corn with him from county to county. This corn was furnished by the University and had been scored by corn experts at Purdue.

This year that line of work is being continued. The older members of the corn club and the members of the vocational classes in agriculture are showing very keen interest in the work. Many county agents are very glad to have this opportunity of strengthening the club work and providing a more complete plan of work for the young people.

The elimination contest selects a team to represent that county in the State Corn Judging Contest held at Purdue during the Boys' and Girls' Club Round-up. A month before the round-up more than twenty counties had held contests for more than 500 boys. Many others are applying for help, so that it is extremely difficult to take care of the demand.

The idea underlying the whole thing is of course educational. The method is a combination of doing and knowing. One question commonly asked is, "Name the things that disqualify a ten-ear sample." The boys readily write down, "A yellow ear with a white cob, or twelve or more cross kernels on a single ear." But when a fairly good looking sample containing such an ear is laid out before them to place, they do not hesitate, in a great many cases, to put it first, never seeing the white cob or cross kernels, although they stand out like a "light-house on a rocky shore." It is this keen sense of observation and the knowledge of the facts in question that makes the work so valuable to the boys. The spirit of competition and contests appeals strongly to them. The various samples are so arranged that it is often difficult to decide on the ratings and it requires considerable skill to obtain a good grade. That appeals to boys as being worth while.

At the round-up the contest is between counties. Last year the Indiana Corn Growers' Association gave a very large and beautiful trophy to the State Championship team. This trophy will be given annually to the highest scoring team. Scott county won it last year with the score of 91.8 per cent. A gold medal was awarded Fred Campbell, of Knox county, who ran up a score of 97.2 as the highest individual.

These fine results are conclusive proof that work started sixteen years ago is bearing fruit and are good evidence that the future corn growers of Indiana will continue to keep the Hoosier State in the front rank as a corn state.

In Russia they hang the profiteers to lamp posts. That's one way to make them see the light.

The Farm Journal in an editorial gives Clifford Thorne's views on the speculation as carried on in grain at the Chicago Board of Trade. Thorne is attorney for the American Farm Federation. He says deals involve fifty-one times the amount of grain received and three times the world's yearly production, the commissions on the yearly business being about three times the receipts at Monte Carlo. Americans are good gamblers, aren't they?

Cow Testing Without Supervision

By E. H. Leiendecker, '19
Instructor in Dairying.

SCATTERED throughout the state are a number of farmers who keep two to ten cows without knowing which of these cows are producing a profit. In many cases these farmers are desirous of determining these facts but are unable to because there is no Cow Testing Association in their community. It is to meet the needs of these farmers that the following plan of testing your own cows for fat is suggested. Before we get into the discussion, however, it should be clearly understood that this method will not be nearly as effective as being a member of a Cow Testing Association. The records will not be official nor as complete and more work will fall upon the owner.

Equipment.

The equipment necessary for this work is not very expensive. It will be necessary to have: (1) a 30-pound milk scale; (2) monthly milk sheets for keeping the record of milk produced daily; (3) corrosive sublimate tablets for preserving milk; (4) a sampling dipper; (5) one-half pint mason jar with lid for each cow, or one four-ounce bottle for each cow.

This equipment can be purchased from any dairy supply house at a cost of about five dollars.

Weighing and Sampling.

The problem as we now have it is to obtain the pounds of milk and butterfat given by each cow in the herd for one lactation period. It is necessary to tack the milk sheet in the milk room and hang the scale on a bracket near it. Each cow's milk is then weighed after each milking throughout the year and the weight posted on the monthly milk sheet. Adding these figures at the end of the month and the year will give us the monthly and yearly milk production of each cow. One other problem then is to find out the amount of fat in this milk without the aid of a cow testing supervisor and without a lot of trouble and time to ourselves. A fairly accurate estimation of this fat can be obtained by making what is known as a composite sample of the milk given by each cow and then testing this sample. This sample can be obtained in the following manner.

It will take one day out of each month to make this sample. For instance, we will take the sample from each cow's milk next Friday, and we have three cows, numbers 191, 198 and 156, on the farm to test. Friday morning we will milk each cow as usual, weigh the milk and post the weights on the weigh sheet. Before dumping the milk into the can we will stir it thoroughly with the dipper and fill our four ounce sample bottle half full and write the number of that cow on the bottle. Then dissolve in this one preservative tablet to prevent it from souring. Cover the jars tightly to prevent evaporation and set in a dark place or at least away from the direct rays of the sun. This will prevent formation of a tough scum like layer on top of the sample. Place them beyond reach of children or animals as the corrosive sublimate is poisonous and will cause death if the milk is used. This process is again repeated Friday night, adding enough more of the milk to fill the bottle full. In other words, take equal quantities of milk for the sample each time if the same amount of milk was given at each milking. If more is given at one milking than the other, add proportionately more milk to the sample from that milking. After each addition of fresh milk rotate the jar to mix the milk and further prevent the formation of a tough leathery layer of cream on top of the can.

We now have three bottles numbered 191, 198 and 156 with about four ounces of milk in each and we want this tested for fat. When you take your can of cream to the cream station Saturday morning take the samples along and have the station man test them for you. Not all stations are equipped for testing milk, but it will be very easy to arrange with most station men to have him do your testing during his spare time, as all the additional equipment he will have to obtain is some milk test bottles and a pipette. In some cases a slight charge may be made for this service.

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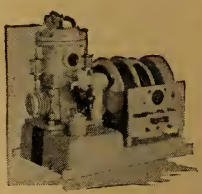

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RESULTS OF FARM LIGHTING PLANT TESTS UNDER RATED LOAD CONDITIONS

Conducted by the Department of Agricultural Engineering, Ohio State University, February 7, 8, 9, 1921.

Of 23 Makers Invited to Participate, the Following Firms Only Reported for Tests:

	Name of Plant	Mfrs. rating at time of test—watts	Mfrs. new rating Feb. 12, 1921	Rated speed	Average observed speed	Hours on test	Average watts	Total watts	Kind fuel used	Pounds fuel used	Gallons fuel used	Fuel consumed per kw. hour		Cost fuel per kw. hour—cents	Amount lubrication oil used—total gal.	Cost of lubrication oil per kw. hr.—cts.	Total cost oil—fuel per kw. hour—cts.	Cooling system used	
												Lbs.	Gals.						
1	Delco	750	600	1500	1577	28	680.80	19062	Kero	37.59	5.57	1.972	.292	5.84	.18	1.18	7.02	Air----	1
2	Delco	1000	850	1150	1157	28	892.00	24976	Kero	44.19	6.55	1.769	.262	5.24	.34	1.70	6.94	Air----	2
3	Delco	1250	1250	1300	1353	28	1298.70	36363	Kero	66.40	9.83	1.826	.270	5.40	.35	1.23	6.73	Air----	3
4	*Phelps	1500	----	1335	1342	28	1437.40	40247	Gas--	67.29	10.95	1.672	.267	7.48	.114	0.35	7.83	Water	4
5	Swartz	1000	----	850	928	28	1064.30	29800	Gas--	39.63	6.47	1.33	.217	6.07	.09	0.4	6.47	Water	5
6	**Willys	1250	----	1350	1332	8	1216.00	9728	Kero	15.43	2.28	1.586	.234	4.68	.237	3.05	7.73	Air----	6

*Plant appeared to be pulling rated load; later calibration of instruments showed load below rating; plant capable of pulling rated load satisfactorily.

**Machine did not run full 28 hours because of lack of proper adjustment. Not fault of machine. Test not final, as comparisons can only be made under 28 hour run, which will be run later.

Delco plants did not start tests on time because adjustments had not been made previous to time of starting.

Swartz plant did not start at scheduled time because operator was late in arriving.

NOTE—All plants on test were stock models fully equipped with muffler and regular instruments and batteries.

Data	Kero	Gas	Oil
Test specific gravity	.810	.735	
Cost per gallon	20c	28c	$1.25

DEPARTMENT OF AGRICULTURAL ENGINEERING

(Signed) F. W. Ives, G. W. McCuen, P. R. Potter, Robert R. Thompson

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Figuring Butter Fat.

Let us suppose that the tests have been made and found to be as follows:

No. Cow	% Fat
191	4.0
198	3.2
156	4.8

The first conclusion that most farmers arrive at is that No. 156 is his best cow and No. 198 is not nearly so good. Let us figure it on a butter fat production basis to arrive at the real facts.

At the end of the month the daily productions were added and found to be:

No. 191— 860 lbs. milk
No. 198—1100 lbs. milk
No. 156— 630 lbs. milk

To find the pounds of fat in this milk multiply the test by the pounds of milk, as:

$860 \times .04 = 34.4$ lbs. fat
$1100 \times .032 = 35.2$ lbs. fat
$630 \times .048 = 30.2$ lbs. fat

We gain from these figures that cow No. 198 instead of being the poorest cow actually gave the largest number of pounds of fat and was the most valuable cow. These records can now be carried even farther and the feed cost obtained for each cow. This figure subtracted from the returns for each cow from the sale of butter fat will give the profit per month and year.

Summary.

The necessary steps in keeping your own records will be:

1. Weigh each milking every day and post on milk sheet.
2. Make a composite sample of milk each month from one day's milkings.
3. Add equal quantities to sample bottle if equal quantities have been given at each milking.
4. Have station operator test milk.
5. Add monthly milk production, multiply by test to get fat production.

A Rural Community House

RESIDENTS of the Blue Grass communitcy in Vanderburgh County have not been worrying about the low price of farm products and the high price of farm machinery, building materials, etc., during the past season. This unusual situation is due to the building of a community house at Blue Grass last year, and its use for various sorts of entertainment almost every night during the past winter.

About a year ago Rev. C. A. Shake, pastor of the Community church, who had been working for a community center for the young people hit on the plan of a community meeting place for both old and young. He interested some of the leading farmers and a committee was named to work out plans for a building and another committee was chosen to raise funds.

The building committee called on C. A. Norman, rural engineer on the extension staff of Purdue University, to help them work out a plan. At the close of the harvest season, after funds had been raised, several men in the neighborhood dug the basement and a local contractor was engaged to supervise the building. Various men donated their services for a few days each, and the building was dedicated Thanksgiving.

Since then the building has been used practically every evening except Sunday. 80 young men played on the various basketball teams, and meetings of all kinds were held, at some of which a small admission fee was charged. Money collected in this way went toward the upkeep of the building and the purchase of new equipment.

The building consists of a full basement including kitchen, dining hall, show or exhibit room, furnace room, room for light plant and water system, both boys' and girls' shower baths, and locker rooms. The main floor includes an auditorium, basketball court, office and ladies' rest room. There is also a library or social room on the second floor.

Plans of this structure have been prepared for general distribution by the Division of Rural Engineering, Purdue University, and may be obtained at the cost of printing and mailing. Other assistance may be obtained from the University in the way of additional plans and methods of organization. Many communities have this problem and that of erecting sales pavilions under consideration and are merely waiting until the price of building material drops sufficiently.

Alumni and Local

Courtesy Purdue Alumnus

Coach W. H. Dietz.

PURDUE ACQUIRES NEW FOOTBALL MENTOR.

Major Kellog, head of the Physical Education Department, has succeeded in securing Coach William H. Dietz to lead the football team in the future.

Coach Dietz comes highly recommended. He is a graduate of Carlisle, where he was tackle on the famous teams of 1907 to '11. Dietz, on graduation, acted as assistant coach at Carlisle for three years. In 1915 he took charge of the Washington State team and twice won the coast championship. In 1918 he took charge of the Mare Island team and again won the coast championship. Mr. Dietz has not been engaged in coaching for the last two years.

The new coach has already taken charge of affairs and a large group of picked men have started spring practice. All indications point to a much more successful season than that of last.

ALUMNI NOTES.

H. S. Knisley, '19, may be addressed at 1520 3rd Ave., Cedar Rapids, Iowa.

E. F. Johnson, '17, is connected with the Johnson Seed Farms at Stryker, Ohio.

H. S. Heckard, '20, is working at the Hillshade Stock Farms, near Rockland, Wis.

Aigus Dean, '15, is living at Nuevo Cal.

W. W. Magill, '18, is in charge of the Division of Markets and Rural Organization at Raleigh, N. C.

Geo. M. List is living at 506 W. Myrtle St., Fort Collins, Colo.

E. H. Moss, '20, is farming near Logansport.

W. H. Martin, '18, an instructor in the dairy department at Pennsylvania State College, visited the University on business during the holidays.

C. A. Wickard, '15, is farming near Camden, Ind.

O. B. Riggs, '20, is farming at Fairbanks, Ind.

S. D. Sims, '20, is teaching agriculture in the High School at Odon, Ind., and will take over and operate a farm beginning May 1st, 1921.

H. H. McMahon, '20, is teaching Vocational Agriculture at Shelbyville, Ind.

E. M. Christen, '19, is connected with the Animal Husbandry Department at Pennsylvania State College.

W. O. Mills, '12, of Mooresville, Ind., is a dairy farmer with a herd of pure-bred Guernseys.

F. O. Cullar, '19, is farming at North Liberty, Ind.

M. J. Proud, '17, is at the head of the Cooperative Department of the Studebaker Auto Company at South Bend.

E. G. Sieveking, '20, is connected with the Agricultural Chemistry Department of the Missouri College.

H. R. Smalley, '11, is now with the National Fertilizer Association at Chicago, Ill.

W. L. Lloyd, '18, is Associate Editor of the Ohio Farmer with offices at Cleveland, Ohio.

F. J. Hupe, '17, No. 5826 S. Park Boulevard, Chicago, is office superintendent of Swift & Co.

APPOINTED ASSISTANT HEAD OF AG. BUREAU.

Silverio Apostol, Ag. '08, has recently been appointed assistant director of the Philippine Bureau of Agriculture. Mr. Apostol returned to the Philippines immediately after his graduation, and has been promoted from one position to another since entering his field of work in the islands.

THE PURDUE AGRICULTURIST

Published monthly during the school year, by Agricultural Students of Purdue University, LaFayette, Indiana.

MEMBER OF AGRICULTURAL COLLEGE MAGAZINES

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The purpose of THE PURDUE AGRICULTURIST is to disseminate the latest scientific knowledge concerning Agriculture and Home Economics, to incite the young people of Indiana to a greater desire for training in Agriculture and in the industrial pursuits, to publish matters of interest concerning the Purdue School of Agriculture and the Purdue Experiment Station, and to afford opportunity to the students for training in Agricultural journalism.

BOOST PURDUE.

Is it true that Purdue men are too much inclined to overlook the greatness of their own institution—the school that gave them their start in the business of life? Would not our Ag. school stand even higher than it now does if we gave it the publicity that its quality merits? While the alumni of Iowa, Illinois, Ohio, and other colleges of less importance flaunt their alma mater in the face of the world to such an extent that even though they may not have half the cause for boasting that we possess, still they make so much noise that finally the world in general accepts their boast as fact and they are given a rank that they may or may not merit. Purdue men on the other hand, it seems, are inclined, if not to go to the other extreme, to at least sit back and fail to crow when there is the most to crow about. As a result we are not always looked upon by agricultural men in other sections with the respect that our institution deserves. In a letter to the "Hoof and Horn" Club, Dr. Seulke, '13, who is eastern representative of the American Aberdeen-Angus Breeders' Association, emphasizes this idea, and then using the Animal Husbandry Department as an example, sets forth our reasons for boasting: "What other school has a man the equal of Dean Skinner? Perhaps you do not appreciate him. I know we never did until we got away from the University, and began to realize his high standing in the world at large and the Animal Husbandry part of it in particular.

"What school can boast of a man who can show a steer just as Professor Gobble can, or one who knows "pigology" as does "Billie" Smith, not to mention heredity and the Mendalian Theory. Who knows better than "the King" just what happens to silage when it gets inside a steer. The others, who have joined them since my time, must be equally famous for one thing or another or they could not hold their places at Purdue.

"Then, do not fail to appreciate that quiet, unassuming Scotchman who does so much for Purdue, but asks for so little recognition. Do you realize that Jack Douglas could have his pick of wealthy partners and fancy live stock? Look back and think over what he and the Dean have done for you and Purdue in the last twelve years.

"What school has a Dutchman for a shepherd who can boast as broad a vocabulary or as big a heart as ours?

"Then look at the live stock and equipment Purdue can boast. You may take it as a matter of fact, but many of us remember when there was only one old Shorthorn bull, a few Berkshire sows, and when poultry was a part of Animal Husbandry and the equipment consisted of six Brown Leghorn pullets and a rooster belonging to the Dean and kept in his own backyard.

"For the last eight years I have been

trying to teach Animal Husbandry at institutions that had no equipment when compared with Purdue, yet some of them were rated higher than Purdue by the uninformed merely because you and I and other alumni and other students have not made enough noise."

LAST ISSUE OF PRESENT STAFF.

With this issue of the Agriculturist, the duties and responsibilities of the present staff are ended. The newly elected staff, with Mr. K. E. Beeson as editor-in-chief, will have full charge of the June issue. It is with a feeling of genuine regret that we thus lay upon other shoulders the burden which we have borne for the past school year. To sever the personal ties formed by our working together for a common cause strikes a sentimental chord in the heart of each staff member. We are forcibly reminded of the fact that soon we will be obliged to leave our alma mater and venture forth upon Life's stern battlefield where each man stands or falls according as he possesses or lacks merit.

Our efforts during the past year have centered around a few definite objectives and our success in approximating our aims is best judged by those who know our problems most intimately and have been in closest contact with our work. We have attempted to inject "punch" and human interest into our editorial matter; to improve the mechanical make-up of the paper by featuring a page of cuts each month; to create an efficient and harmonious staff organization; and to reach a large number of high school students by means of the Essay Contest. This last feature of our work has been efficiently handled by Mr. M. S. Smith, '21, and his co-worker, Mr. George Fross, '24.

We wish to thank all who have contributed in any way to the success of the paper this year. Many faculty members, students, alumni and others have kindly contributed splendid articles. The faculty of the School of Agriculture and the staff of the Experiment Station have stood ready to co-operate and advise at every time of need. This manifestation of interest is deeply appreciated by every member of the outgoing staff.

To the new editor-in-chief and his staff we offer heartiest congratulations and best wishes. They have already demonstrated their working ability, their enthusiasm and their conception of the problems to be encountered. May the Agriculturist under the new regime contribute its full share towards the building of a permanent Hoosier Agriculture and a Greater Purdue.

ANNUAL BOYS' AND GIRLS' CLUB ROUND-UP WILL BE ONE OF BIGGEST AND BEST EVER HELD

Scheduled May 3-6 at Purdue University.

Hundreds of boys and girls in Indiana are looking forward with great expectation to the Third Annual Boys' and Girls' Round-up, to be held at Purdue University, May 3-6, 1921. An unusual proposition is being presented this year in that those attending are going to get to return to their homes at half fare rates, arrangements having been made with the railroads for this.

Registration will take up the major portion of the first day, May 3. There will be inspection trips around the University and the Engineering Schools will hold "open house" on the first day, at 7:30 p. m.

On May 4, President Stone and Dean Skinner will give welcome addresses. Stunts will be put on by some of the counties and yells and songs will follow. Dr. Ada Schweitzer, of Indianapolis, will give a lecture on "Physical Exercises."

The next day Miss Anna Cowles of the Junior Red Cross, Washington, D. C., will address the girls. Professor Christie will give an illustrated lecture at Fowler Hall. There will be a splendid program given in the evening by the Purdue Dramatic Society, the Purdue Band, and by Grace King, who will give an illustrated lecture.

On the last day there will be an "Inspection of Live-stock" at the Purdue Farm.

The club members will have the opportunity of hearing Mr. Ivan Hobson and Miss Gertrude Warren, national club leaders from Washington, D. C.

There will be judging contests for the boys in dairy and beef cattle, swine, corn, and eggs, and for the girls in bread, garments, and canned products.

There will be demonstrations and lectures given in farm management, swine, soils, corn, poultry, horticulture, and cattle. Stuart Field and the Gymanisum will be open for games and play.

WHICH WAY IS YOUR STOCK GOING?

Down With the Scrub—Up With the Pure-Breds.

SHADELAND HEREFORDS

—HERD BULLS—
Woodford 8th, Woodford 71st, Disturber Magnet.
Herefords for Uniformity and Utility.
SHADELAND STOCK COMPANY,
LaFayette, Indiana.

ANGUS-CATTLE

We breed and produce the kind of animals that sire champions and sell for the top-most prices. If you are in the market for anything, or going to be, it will be to your interest to see or write me. 37 years of successful business. No other breeder can boast of such a record.

M. A. JUDY, West Lebanon, Ind.

BIG-TYPE POLAND HOGS

PICKETT AGAIN and MOLLIE'S CLANSMAN head our herd.

Our sows are the best. Several by Disher's Giant, Evolution, Big Bob Orphan and others. For sale at private treaty only. TRIED SOWS, GILTS bred or open.

BIG TYPE POLAND FARM,
Loogootee Indiana.

One of the big events of the Round-up is the Purdue Egg Show which has been scheduled for that week so the boys and girls will have an opportunity to see it. It will be all the more interesting in that a great many of the club members will have entries in the show.

Many prizes won by club members will be awarded at the Round-up. There are so many good things coming that week that it will be impossible to enumerate all of them. All in all there will be one grand and glorious time.

PURDUE STARTS 1921 BASEBALL SEASON.

Coach "Piggy" Lambert's men started the season on April 2 by downing the DePauw aggregation by a 3 to 1 score. Wallace occupied the mound for Purdue and showed true championship form by striking out 11 men. The second game of the season, with Wabash, showed Purdue in a poor light. The team seemed unable to hit Sherman, the Wabash hurler, and consequently came away with the short end of a 7 to 1 score. Wabash bunched their hits in the fifth and were aided by several untimely errors from the Purdueites.

The first Conference game of the season was scheduled with Illinois for April 9, but the game was called on account of snow. Purdue crossed bats with Butler for a two-game series on the 11th and 12th. "Piggy's" men got away with eight runs, while Butler didn't succeed in scoring in the first game. Wallace pitched a wonderful game, struck out eighteen men and only gave five hits. The team played errorless ball. Pat Page sprang a surprise on the overconfident Purdue team in the second game by winning with a 3 to 1 score. Volkstadt pitched the first four innings and showed himself to be a coming man.

Purdue has a hard schedule in front of her, but if the team can get it's batting eye again the Old Gold and Black will be a strong contender for the title.

Last year the United States imported 35,756,427 bushels of wheat, of which 34,905,811 bushels came from Canada and but 737,790 bushels from Argentina. We also imported 800,788 bbls. of flour from Canada.

WHO SAID CHICKEN HOUSE?

During "Farmer's Week" a well dressed lady accosted a student in front of Ladies' Hall (built in the ancient days but still doing modern work) in the following manner:

"Pardon me, I am a stranger here, I just came in this morning to attend the poultry short course. Isn't this the poultry building?" pointing to the ancient structure.

J. R. Smyth, '20, is now in poultry extension work at Kentucky State College at Lexington, Ky.

J. A. Little, '19, is farming at Lowell, Ind.

W. J. Edwards, '16, at 395 Grove Street, Columbus, Ohio, is working with the Blue Valley Creamery Co.

Educational Hygiene

By L. A. Dougherty, '21.

THE results of the physical examinations given men entering the army and navy during the war have shown clearly that a program of physical education is needed in our high schools.

The larger cities have led the way in instituting physical education courses in their schools.

A mistaken idea has existed among country people that boys and girls in the country should be healthy because of their environment. But in reality physical education is needed in rural districts as well as in the city. People everywhere are entirely too ignorant concerning the nature and care of their bodies. Many students in agriculture have spent much more time in studying the anatomy and care of farm animals than they have of themselves. Surely there is no question as to which is the more important.

The Child Health Organization has set forth a program which it would endeavor to see put into effect. It would teach health habits and secure adequate health examinations for all children in the public schools of the country.

The interest of children would be stimulated by placing both weighing and measuring scales in the schools and acquainting children with the ways and means of securing normal weight and height.

Proper standards would be determined for examinations with reference to normal nutrition and growth. Health records would be prepared and kept during the entire school life of the child and it would be correlated with his scholarship record.

A consideration would be given to malnutrition among school children. Special classes in nutrition would be held.

Community instructions would also be given in the proper feeding of children. An effort would be made to safeguard children in the various occupations. Propaganda would be issued to awaken the public to the necessity of conserving the health of the school child as a basis of national safety and security.

Many people maintain that the home is the proper place to teach health habits. Undoubtedly this is true, but through neglect or lack of knowledge, proper instruction has not been given in many cases. Instruction should be followed up by practice under supervision wherever possible.

Many children go through school seriously handicapped by bodily defects, such as of the eye, ear, nose and throat. Insofar as is possible all defects should be removed.

Oral hygiene must not be overlooked. Many children have neglected teeth which could be saved with timely dental attention. Many serious ailments are laid to the teeth. Adenoids and tonsils are factors in indigestion and undernourishment.

The war has also emphasized the need of social hygiene and sex education. Such serious problems can no longer be left under the veil of false modesty but must be dealt with firmly and conscientiously.

Communities should not delay action just because there are not state laws providing for such education. Some of our social workers who think the slums of the city provide the only field for their work should spend more time in observation of conditions at home. They will find a fertile field in most communities.

Some of the states have instituted excellent laws regarding physical education and hygiene.

The New York program covers the following points:

1. Instruction concerning the body and important facts of hygiene.

2. Individual health examinations and personal health instruction.

3. Physical exercise as a health habit, including gymnastics, marching, organized supervised play, recreation, and athletics.

The California statute states the aims and purposes of physical education as follows:

1. "To develop organic vigor, provide neuro-muscular training, promote bodily and mental poise, correct postural defects, secure the more advanced co-ordination, strength and endurance, and to promote such desirable moral and social qualities as the appreciation of the value of co-operation, self-subordination and obedience to authority, and higher ideals, courage and wholesome interest in recreational activities.

2. "To promote a hygienic school and home life, secure scientific sanitation of school buildings, play-grounds, and athletic equipment thereof."

Storage of Clothing

By Miriam Beall Ogle, '16.

WITH the change of seasons there is also a change of clothing. Certain garments in the wardrobe will not be needed for several months. If such garments are carefully stored more room is provided for such as are in use and the stored garments are saved from dust and useless handling.

All garments should be put away clean, and in repair. It takes no longer to replace missing buttons and hooks now (and is apt to be much less inconvenient) than to wait until some sudden change in temperature demands the immediate use of the garments several months hence.

For the same reason clothes should be put away clean. Further soiled garments are far more likely to attract destructive pests. Washable garments are best stored unironed and unstarched. Starch is likely to turn the material yellow, and it is very attractive to silver fish. Blue paper or deeply blued cloth used as a covering for white materials is said to help keep them from yellowing.

All woolens and furs should be very thoroughly aired and sunned. They should be well brushed and lightly beaten to remove dust, and insect eggs which may have been deposited on them.

Avoid storing useless things. Storage space is usually at premium, quantities of useless materials require care and are apt to harbor moths, and there is too much need all about to justify anyone keeping garments that for her have passed their day of usefulness.

Special attention should be given to the folding of garments to be stored in drawers or boxes. Fold the garment on a table or bed, making as few folds as possible and striving to make those along seams. Sleeves may be lightly stuffed with tissue paper, thereby avoiding wrinkles.

Chests made of, or lined with cedar make excellent storage places because the odor of the cedar is unpleasant to moths, etc, and because such chests are usually practically air tight so that pests cannot gain entrance. A convenrent and economical closet may be made in the attic of such materials as beaver board, especial care being given to obtain a tight floor and well fitting door. When such a closet is filled it may be sealed and so become pest proof, if the garments were free from insects and their eggs before being stored. Tailors' boxes or suit boxes make good storage boxes because they are not very deep, which provides against crushing the garments at the bottom by the weight of great numbers above. Such boxes are easily sealed with strips of gummed paper or cloth. Articles may also be wrapped in newspapers. The papers should be well lapped to prevent entrance of insects. The odor of the ink seems to be uninviting to moths.

Tobacco, camphor, cedar, naphthalene, and the like, give off odors which are repellant to moths, and may well be used in packing. But it must be remembered that these odors do not kill either the moth or its eggs, hence the necessity of having the garments freed from them by careful airing and sunning before being stored.

It is perhaps true economy to put very expensive furs in cold storage, where temperature is kept so low that insect life is impossible.

On the outside of each box and closet should be fastened a list of its contents. Every package should be labelled. This will take only a few minutes at the time of storing and may save hours of hunting through various packages at a later date.

OH SWEET SLEEP!

Professor (in judging class).—"Mr. Doodle, which of these sheep did you think had the best handling qualities?"

Student (waking abruptly).—"Why, lessee, I thought the second one handled himself the best."

DOOSHE?

Recently a Purdue professor was instructing a group of farmers as to the mysteries of legume culture. During the course of the lecture the following dialogue took place:

Professor.—"Now who knows what a legume is?"

Farmer (raising his hand).—"Why, a legume is a bean with noodles on its roots."

"Inside Dope"

Facts of Interest About Purdue and Its Farms.

At the recent Fourth Annual Shorthorn Congress Show and Sale held in Chicago, Dean J. H. Skinner purchased a notable addition to the University beef herd. This animal is a yearling heifer, Bluemont Augusta 922834. She belongs to the famous Augusta family, one of the best known Scotch tribes. She is well bred and is a good individual. She comes from Bluemont Farms in Kansas.

Another newcomer to the Purdue Shorthorn herd is Maxwalton Strawberry, a two-year-old heifer purchased from Carpenter and Ross, Mansfield, Ohio. She is sired by the famous Maxwalton Revolution and is bred to Imported Rodney, a $20,000 individual. If a bull calf is dropped he will probably be used for the herd sire.

There is a total of thirty-seven animals in the University Shorthorn herd—thirty-five females and two bulls. The herd sire is Lavender Sultan, who has sired so many prize winners at the International. The younger bull is White Champion, purchased at the International a year ago from Prescott and Sons of Tawas City, Mich. The outstanding female is Mary Sempstress, dam of Merry Monarch, grand champion steer in 1917. She is due to calf soon.

The Angus herd contains a total of fifty-five animals—fifty-three females and two bulls. The herd sire is Black Knight of Greenwood. Recently he had the misfortune to break one of his hind legs. It was carried in a plaster cast for some time and now he seems to be almost completely recovered from the injury. He came from the farm of Frank Baker at Greensburg, Ind. The second bull is Black Monarch 22nd. He was bred on the farm. The leading female is Fancy Queenette, who is the dam of Fyvie Knight 2nd, grand champion at the 1918 International. Another outstanding individual is Pride of Maple 6th, who is the dam of Black Ruler, champion at the 1920 International.

There are thirty animals in the Hereford herd—twenty-eight females and two bulls. The herd sire is Bonnie Lad's Model, sired by Bonny Lad 20th, owned by Walter L. Yost of Kansas City. The other bull is a home-bred animal sired by Prince Fairfax, a son of Perfection Fairfax. Recently six heifers and one home-bred bull were sold.

There are a total of forty head of horses of all breeds on the University farm. The Percherons lead the list with a total of nine individuals. They are headed by Jersey, an imported stallion of good individual characteristics. Among the females is Tulip, purchased last spring of G. A. Dix of Delaware, Ohio. She is a four-year-old and has produced one mare colt, Purdue's Tulip, the sire being Jehovah. Then there are two four-year-old fillies, Carlahure and Carferite, both sired by Carnot, probably the highest priced Percheron stallion in existence. They are due to have colts in May. Regina, a seven-year-old mare by the imported stallion St. George, has produced three colts—a three-year-old filly, Brigina, sired by Brilliant, and two geldings, Hector, a two-year-old, and Bob, a yearling, both sired by Jersey.

Purdue has three Belgians, all mares. They are Jeanette, eleven years old; Duchess Derossei, thirteen years old, both imported, and Duchess, six years old, a home-bred mare.

There are two Shires, both mares—Diamond, sixteen years old, sired by Solomon Commotion, and Mary Queen, sired by Barnet 2nd.

R. W. Shafer, '15, is with the Beatrice Creamery Co., at Muncie, Ind.

D. D. Ball, '17, is County Agent of Rush County with offices at Rushville.

M. L. Hall, '20, is working in the Agricultural Experiment Station at Lexington, Kentucky.

Ralph Morrish, '20, is superintendent of the Boys' and Girls' Club work at Kansas State.

R. T. Merkle and C. E. Hampke, both of the '19 class, are working on the Gossard Breeding Estates at Martinsville, Ind.

L. E. Husted, '20, is now at Truesdale, Iowa, doing extension work, but will be back on the farm this spring.

L. K. Whelan, '17, who is with the International Harvester Co., may be addressed at 1202 S. LaFayette Street, South Bend, Ind.

Inquiries From Our Readers

Write Us About Your Problems—Purdue Can Help You.

Effect of Water Glass on Metal Tubs.

Question.—We wish to put down several hundred dozen eggs in water glass. Will it be safe to put them in galvanized tubs, or would the liquid have corrosive action on the metal? Perhaps wooden barrels could be used.—F. D. Co., Elkhart, Ind.

Answer.—Knowledge is lacking on the influence of water glass on metals. However, successful results have been obtained by the use of glass, earthen or wooden vessels. Clean wooden barrels will serve the purpose.

Chicks Crowd Outside Hover.

Question.—I have 180 chicks nearly two weeks old that crowd up in the corner away from the hover. I tried both higher and lower temperatures, but they still want to crowd up, and at night I have to place them under the hover. What can I do to prevent this? I have lost seven already.—Mrs. R. W. S., Kewanna, Ind.

Answer.—It is almost impossible to break chicks from the crowding habit. The injurious effects of crowding, however, can be largely controlled by sloping platforms in the corners and along the sides of the house. The platforms should be made of laths, set close enough that the chicks can not creep between them. This platform will allow a free circulation of air underneath the chicks and will prevent them from suffocating.

In order to prevent any other chicks from crowding, place a wire pen around the hover when the chicks are placed in the house. This will prevent them from spreading over the house and they will learn where to find the place of warmth. The pen should be made larger every day and by the fourth or fifth day it may be removed.

It is important that sudden changes in temperature be prevented. The temperature for the first week may vary from 95 to 100 degrees, the second week from 90 to 95 degrees, the third week from 85 to 90 degrees, and the fourth week from 75 to 85 degrees Fahrenheit.

The thermometer should hang at the edge of the hover, with the bulb level to the top of the chicks' heads.

Using Rag Doll Seed Tester.

Question.—I should like some information on the rag doll seed tester. How moist should it be kept, and where do you store it for best results?

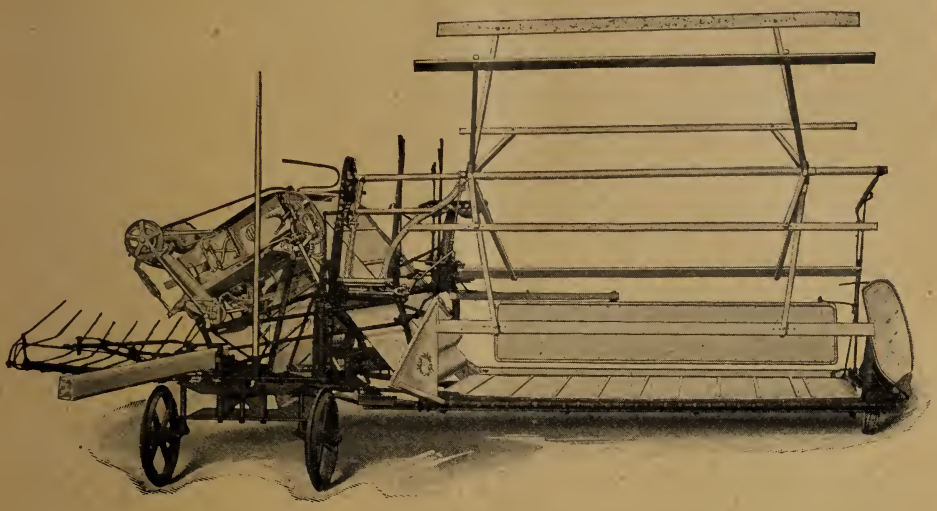
Answer.—The rag doll should be made of ordinary unbleached muslin, and the tips of kernels should point downward. Commence rolling up at the end you quit with. Tie in the middle only and put into a bucket of water in the evening and let soak until morning. Put where it may be kept at 75 degrees and keep moist but not soaked. It may be stored in a covered galvanized box where it can be kept moist or other convenient receptacle where it will not dry out. It will be ready to read on the sixth or seventh day.

Pasturing Alfalfa.

Question.—Last spring I started a patch of alfalfa that did fairly well. Is there any danger in pasturing it this year?

Answer.—If you have a good stand and it made a good growth last season, you should be able to pasture your alfalfa this year. It should not be pastured so heavily that it will be eaten too close to the ground, as the crowns are thus destroyed and the crop seriously damaged. Sheep, horses, and hogs are hardest on alfalfa pasture, because of close grazing and care must be used that they are not permitted to eat it off too close to the ground.

The four greatest factors in the determination of labor income on the farm are size of the farm business, returns per unit of crop area, returns per animal unit, and efficiency in the use of labor. U. S. Farmers' Bulletin No. 1139, on "Analyzing the Farm Business," gives the results of surveys on over 1100 farms in Clinton county, Indiana, based on these four factors. On the farms which were above the average of the region in one of these factors, the average labor income was $252; on those which were above the average in two of these factors, the average labor income was $496; on those which were above the average in three factors the labor income was $943; and on those which were above the average in all four factors, the average labor income was $1606.



The Hands of the Clock Are Coming to Harvest Time

THE time for gathering in the year's crops and profits is near at hand. The critical time approaches when all the binders of the nation must go out and compete with weather and field difficulties to save the maximum part of the yields.

Timely repairs will be many a man's solution for this harvest, but to limp through the season with machines that are really outworn will prove disastrous. No farmer can afford to run a binder that has served too many years, nor can he practice true economy with a small, inadequate machine if his acreage and power demand an 8-foot binder.

We pledge ourselves, through our branch houses and dealer organization, to give our utmost in repair service and co-operation. Nevertheless, all of us know that it is wrong practice to repair a machine which is too old to be efficient even when repaired. Such a machine will defeat the great purpose by cutting down production per acre and per man. It is not even short-term economy because the machine will have to be abandoned too soon to make repairs for it a good investment.

Take careful account of requirements as harvest time approaches. If you need new machines, place your reliance in binders bearing the time-tried, service-proved names—**McCormick, Deering,** and **Milwaukee.** Grain binders of these familiar brands will this year again demonstrate that nearly ninety years of development and service of the world stand behind them. Safeguard your grain crop while you have time by ordering time- and labor-saving harvesting equipment and genuine I H C repairs from the nearby International dealer.

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For Cheese-Making: Hansen's Rennet Tablets, Junket Tablets (for Cottage Cheese), Cheese Color Tablets.

For Butter-Making: Hansen's Danish Butter Color (4 oz. and 1 oz. bottles), Hansen's Buttermilk Tablets or Lactic Ferment Culture for perfect ripening of cream for butter and milk for cheese and commercial buttermilk.

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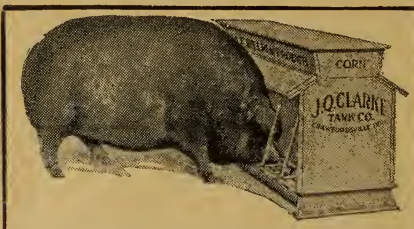

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CATALOG

PRINTERS

LAFAYETTE, INDIANA

UNIVERSITY TO HAVE MUCH NEEDED BUILDING.

In its April meeting the Board of Trustees considered a building campaign outlined by President Stone which is to be carried out in the next three to five years. The immediate erection of a modern Home Economics building at an approximate cost of $200,000 was approved. Bids are to be received by July 1 and work will be started as soon as possible. A new recitation hall was also considered favorably and will doubtless be erected in the near future.

ALPHA ZETA INITIATES NINE NEW MEN.

Alpha Zeta at its annual spring initiation honored nine men. The fraternity was founded at Ohio State in 1897 and the local chapter was installed in 1908.

One honorary member, Prof. H. G. Philips, and eight active members, K. E. Beeson, S. Castell, M. J. Cook, W. Jackson, G. L. Jordan, F. Thomas, C. M. Thompson, P. O. Wilson, all of the 1922 class, were initiated.

PURDUE MEN GIVE PROGRAM BEFORE ILLINOIS AGRICULTURE SOCIETY.

Amid the gloom of clouds and rain four Purdue men stepped from the train onto black Illinois soil. Yes, the weather was unpleasant, but it in no way affected the hospitality of our hosts for our representatives report that they were royally entertained.

It has been the custom for several years that the Illinois Agricultural Society and the Purdue Agricultural Society have an annual exchange program. This makes possible a closer acquaintance among the students of the two states and creates a friendly feeling between the Hoosier and Sucker Ags.

This year Purdue was represented by J. H. Clark '21, R. E. Roberts '21, W. M. Stewart '24, and R. F. Mead '21. The three speakers used as their topics, "Experimental and Extension Work in Dairy, Horticulture and Animal Husbandry," while Stewart entertained by singing.

The visiting Purdue men were shown about the entire university and farm, and state that the Illinois men could not do enough for them.

Stock Raising
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is as profitable as grain growing. Successes as wonderful as those from growing wheat, oats, barley, and flax have been made in raising Horses, Cattle, Sheep and Hogs. Bright, sunny climate, nutritious grasses, good water, enormous fodder crops—these spell success to the farmer and stock raiser. And remember, you can buy on easy terms
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BACTERIA AS A FACTOR IN SOIL FERTILITY

(Continued from page 355)

action. The nitrogen fixers are especially sensitive to an acid reaction and will not develop if the soil is the least bit acid. This accounts to some extent for the fact that legumes require a basic soil to grow well. On the other hand, the denitrifiers develop better in an acid soil.

Thus we have seen that the conditions of good soil management encourage the growth of the desirable bacteria, while poor soil management tends to encourage the harmful types.

Conclusion.

In conclusion it might be said that soil bacteria are the scavengers of the soil, tirelessly carrying on their endless job of transforming the complex materials of the earth into available plant food, which in turn is again transformed by plant growth into complex organic materials.

PROSPECTS FOR THE SWINE BREEDER.

(Continued from page 351)

The South, a natural hog paradise, abandoned hogs during the past year and devoted her energies to raising cotton. The recent avalanche of cotton prices has caused an enormous financial loss and a sad realization of the mistake in abandoning live stock. The production of feeder hogs is a profitable industry in the South. The mild climate, the long growing season, and the variety of forage crops make it easy to raise two litters a year. The South cannot raise grain as economically as the corn belt, but it can raise pigs to one hundred pounds weight very economically on forage, and sell them as feeder hogs.

Mr. H. L. Gary, manager of Pine Crest Farm, Charleston, Miss., sums up the situation admirably when he says: "With the prospect of the pork maker's business now getting on a profitable basis, with the corn belt farmers seeking a profitable outlet for their bounteous harvests, with the southern farmer turning from his all cotton farming to live stock, and all realizing the need of select breeding animals, we feel that we hog breeders should take on a more cheerful smile, should feel better and talk more optimistically, and look forward to a bright future."

Professor Emrick states that the Purdue band has secured the contract for playing at the State Fair next fall.

About 46 per cent of the horses raised in this country are raised in ten middle western states, which include North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Iowa, Missouri, Illinois, Indiana, and Ohio.

AG. COURSE OF STUDY IS CHANGED.

Radical changes have been made in the courses required of underclassmen. Physics and a new course in Farm Management have been added to the present work and several new options have been opened to upperclassmen.

The per cent of urban population is fast growing in many states. Of all the states Rhode Island has the greatest per cent of urban population, 97.4 per cent being urban and 2.6 per cent rural. At the other extreme we find Mississippi with 86.6 per cent of its population rural and only 13.4 per cent urban.

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Sweetser Drain Tile comes in all sizes from the smallest for lateral ditches, to the largest for big drainage systems. *Underdrainage pays 50% to 100% every year.* You cannot farm successfully without thoroughly underdrained land. Write for prices and number of tile required for carload.

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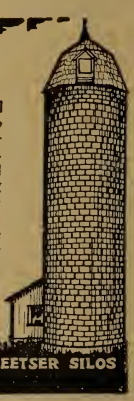

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AT harvest time Cletrac's steady speed keeps the cutting even. Cletrac works close along the fence, turns square at the corners and leaves the stubble clean as a hound's tooth.

Cletrac holds its pace day after day—heat and dust don't bother it. The two tank-type tracks carry it over hard or soft land without digging in or losing power. Its water air-washer always gives plenty of cool, moist air—keeps the motor running smoothly all day long.

And harvesting is only one of Cletrac's many jobs. Agricultural students will find valuable information on power farming in the interesting booklet "*Selecting Your Tractor*". It tells all about Cletrac's year-'round utility. A copy is yours for the asking.

HARD THIS WAY, BUT—

EASY ON A TRACK THE CLETRAC WAY

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Horsepower: 12 at drawbar, 20 at belt pulley.
Length: 96 inches.
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THE J. B. FORD CO.,
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CLUB WORK CHANGES FARM PRACTICES.

(Continued from page 346)

house these fine Guernseys and, so with the help of his son, he put in a concrete floor and made other improvements.

The impressive thing about it all is the splendid spirit of partnership shown. Father and son have co-operated to the advantage of both. There does not appear to be any reluctance on the part of this boy to work, as is often the case on the farm. Chester is an eager helper because it is his job. He is not complaining of long hours or that he was missing a fine day for fishing. He seemed to recognize the fact that father was helping him make a success of his demonstration. The new improvements are his as well as his father's. Here is an idea that has failed to find lodgment in many a father's mind. They plan more land, new barns, new houses that the farm may make more money. The son is rarely consulted and his interests usually not considered and thus the content and happiness of the whole family are little improved by the changes.

No single cause for farm boys going to the city may be more often given than the actual need of earning spending money, of getting a job as the boy usually expresses it. This is not because of the poverty of the farm. It is certainly not due to the scarcity of work. The abundance of farm labor can not explain the situation. Every one knows that the work of the farm has been crying aloud for workers even before the war took so many laborers from the farm. Here is a great producing and manufacturing plant, the farm, with more undeveloped possibilities for jobs, more favorable outlets for initiative and industry than anywhere else in the world and at the same time it loses yearly a large percentage of its best trained labor, the boys who have grown up on its acres without any intelligent effort to repair the loss. Mr. William Jones, of Boone county, is trying out the Boys' Club plan and it seems to be interesting the boy. Club work makes provision for club ownership and membership profit which removes the necessity of a city job to provide spending money. With more than 20,000 club members in Indiana in 19°0, each of whom is a demonstrator of recommended farm practice or home work, we may hope to see some much needed changes in the near future.

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Treated to Withstand Insects

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HISTORY OF PERFECTION FAIRFAX.

(Continued from page 345)

The later show career of Perfection Fairfax was like that of his first, only one of successes. About 1910 he was taken out of the show ring but continued to travel with Mr. McCray's stock show for advertisement. Later he was taken off the show circuit and used only as a herd sire.

It was fortunate that Perfection Fairfax happened to fall in the hands of Mr. McCray, because his herd contained an excellent lot of cows. His greatest merit was his ability to stamp his characteristics on both heifer and bull calves. With Jim Hendry as herdsman and W. T. McCray's excellent business ability, sons and daughters of Perfection Fairfax have topped the show and pure-bred sale rings.

Sons of Perfection Fairfax, such as Richard Fairfax, Baron Fairfax, Corrector Fairfax, Martin Fairfax and Brummel Fairfax and many others, are upholding the name earned by the great sire and making the Fairfax line popular. Sons and daughters of the great bull have sold for over three-quarters of a million dollars and are making enviable records as breeders in all parts of the world where Herefords are found.

Perfection Fairfax died Sept. 26, 1920, at the age of sixteen years, eleven months, and twenty-five days. This is a remarkable age for a bull, especially since his early years were spent being fitted for show. There is no doubt that the Hereford cattle business was made bigger and better by him.

Keep the colt's feet trimmed. A little precaution may save some bad feet.

After people have paid their taxes for about ten years, it should become a habit.

Their meeting was sudden,
Their meeting was sad,
She gave her sweet young life,
The most precious thing she had.

She sleeps beneath the willows,
In peace she's resting now,
There's always something doing,
When a freight train meets a cow.

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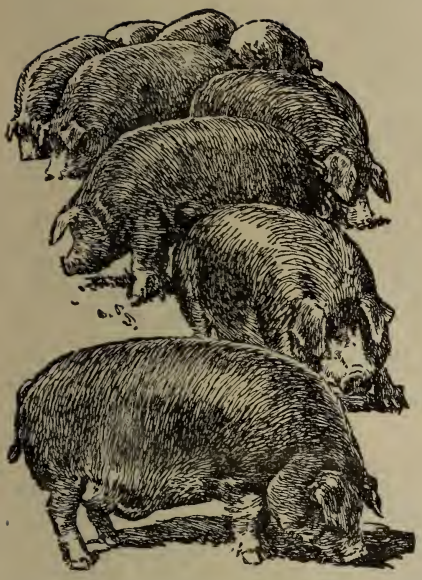

Peanuts, cow peas and soy beans are abundant in July. Farmers along the Seaboard have hogs to sell when they are scarce. They receive the high July, August and September prices.

After Graduation—

WHAT are you going to do when you finish college?

Where can you get good farming land at reasonable cost?

Consider the Seaboard Country in Virginia, the Carolinas, Georgia, Alabama and Florida.

Productive prairie lands can be bought for but little more than the interest that western farmers pay on mortgages. Here you have the combination of low-priced land and feed. Soy beans, velvet beans and peanuts furnish an abundance of rich home-grown concentrates.

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In Florida, South Carolina, Georgia and Alabama pastures can be had every month in the year.

The cost of making pork is low. The average acre of peanuts when hogged down makes about 500 pounds of pork—sweet potatoes make 700 to 1,000 pounds, or equal about four acres of corn.

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The Seaboard is interested in getting the right type of farmers on the right kind of farms. Write me for information about opportunities for the college-trained man.

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( ) Dairying	( ) S. C.
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Please send me your booklet and full information.

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JUNE, 1921

Vol. 15 No. 9

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"*FEED UP*"—and What This Means to Every Dairyman

THE first flush of grass, and the way cows avail themselves of it, tempts many dairymen to reduce the amount of feed at this time of the year.

This is the wise thing to do, but for a short time only.

Start feeding again lightly after the first flush of grass, or your cows will shrink to such an extent that they will not come back strong for the fall work.

If you feed *Buffalo Corn Gluten Feed*, with a fair amount of mill feed, your cows should give from three to four pounds of milk per pound of grain fed.

Your herd needs Buffalo Corn Gluten Feed—in summer as well as in winter—in order to make it a real source of profit to you.

You cannot afford to overlook these facts, or neglect to take a broad view of the cost and return from your herd. Then you will order Buffalo Corn Gluten Feed.

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Just as agriculture is the basis of all wealth, all industry, and all development in the United States so is Live Stock the foundation to successful agriculture. This nation can not thrive without its farms; our farms cannot prosper without their live stock. Today hogs and dairy cattle are in more than one sense stabilizing the nation and at all times live stock maintains the country's progress.

Because the Live Stock Industry occupies the key position in the nation's progress and because the Live Stock Industry is vital in the progress of the business of this company, The Quaker Oats Company recognizing this vital relation and desiring to contribute a part toward the growth and improvement of the nation's most important industry has established a Live Stock Service Department and has selected Professor J. A. McLean to develop and execute this phase of the Company's work.

Professor McLean holds an Arts degree from McMaster University, Toronto, and graduated in Animal Husbandry from the Iowa State College. For over four years he was head of the Animal Husbandry Department in the Massachusetts State Agricultural College where he established the major course in Animal Husbandry; for more than four years he was head of the Animal Husbandry Department in the University of British Columbia there establishing a new department in a new institution. He has judged at many leading fairs from coast to coast. He is an extension lecturer with few equals. Whatever the type of his work is it has been marked with distinction and received with appreciation.

While his work in the Live Stock Service Department of the Quaker Oats Company will require considerable writing yet his services are available to county agents, breed secretaries and other extension agencies for lecture and demonstrational work along all live stock lines; to breed associations and fair secretaries for judging work; to all live stock developing agencies where this department can assist; and to every man who has a problem in the feeding, breeding and management of any class of live stock.

This is intended to be a real Live Stock Service Department; the more it is used, the more assistance it renders, the more pleased we will be.

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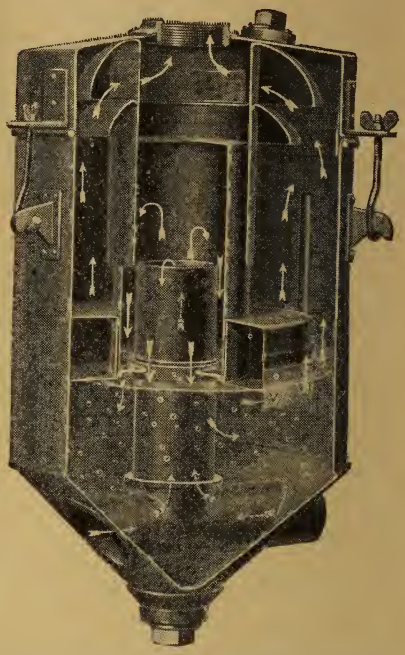

EVEN the best automobile or truck motors are unsuited for continuous successful tractor operation. They are likely to be too short-lived to stand the grind of constant heavy draw-bar work in dusty fields. Aside from having inadequate bearings and shafting for such work, the cylinder walls, pistons and piston rings would be worn down quickly by dust-laden air as if by emery powder. Result: low compression, loss of power, waste of fuel.

All **Case Kerosene Tractors** are equipped with the Case patented air washer of our own design and manufacture. It thoroughly cleanses the air that is drawn with the fuel into the cylinders. The air is drawn through water and two screens, the latter preventing bubbles from carrying dust through the carburetor to the motor. In this way all grit is removed and a clean, moist, highly explosive mixture is delivered to the cylinders.

Clean air is just as essential to tractor motor life as it is to human life. In designing and building Case Kerosene Tractors, every known safeguard has been provided to insure long life, and economical, efficient operation.

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KEROSENE TRACTORS

This is No. 6 of a series of brief treatises dealing with correct tractor design and construction. Keep a complete file for future reference. Students especially interested in tractors are invited to visit the Case factories at Racine, Wisconsin and learn the details of modern tractor construction, at first hand.

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Entered as second class mail matter December 4, 1906, at the Post Office, LaFayette, Ind., under the Act of Congress of March 3, 1879.

Subscription Price One Dollar Per Year. **Advertising rates sent on application.**

Jerseys' Allendale farm, Shelbyville, Ind.

The Purdue Agriculturist

VOLUME XIV JUNE, 1921 NUMBER 9

The Indiana Federation of Farmers' Associations and the Agricultural College Graduate

By John G. Brown, President.

IT is with great pleasure that I am afforded the opportunity of addressing this message, through the Purdue Agriculturist, to the class of about one hundred Seniors in our State College of Agriculture. Through the student publication I also wish my words to reach all the alumni of Purdue.

"Never was there such a demand for sane, constructive, trained, and educated leadership among our farmers as there is today." Read what Mr. J. G. Brown, President of Indiana Federation of Farmers' Associations, says about the duties and responsibilities of the trained agriculturist.

Purdue Agricultural graduates owe a debt to the public for their free education that I often wonder whether they really appreciate as they should. The vast majority of farm boys and girls do not have the chance to secure an education at our State School of Agriculture. Our Indiana farms cannot spare but a small number of the farm boys away from the farm. You owe it to the State as a whole and to this class of our farm population to use this training to the best possible advantage.

You Seniors will soon forsake the class rooms and laboratories to go out over the State, and even to other states as teachers, extension workers, county agents and farmers. You should be concerned very much at this time as to your future under a complete change of environment. You should never have to apologize for having graduated from Purdue.

The Constructive Movement.

As a class the farmers have not had the advantages of an education that would fit them to deal with other callings into which they come into contact. The average farmer of the past and present knows very well the how of farming but he has been, and still is, sadly lacking in the why of his business. You have, or should have both the how and why of farming, and to this extent be able to come into contact with others who have been really trained by experience and education.

In the great forward agricultural movement which is now gaining headway in our State and nation at this time, we, who have been in the front ranks of the Federated Farmer work, have felt very keenly the need for the best minds to put in the lead at every step of the program. Never was there such a demand for sane, constructive, trained and educated leadership among our farmers as there is today. This demand will greatly increase as we go on with a broad agricultural program. The demand will be more than the supply. This is so vital to the whole movement because in our fight for economic justice for agriculture, we are continually pitted against highly educated and specialized men or groups. Agriculture, both State and national, must match wits with these interests.

We need experts in the marketing of farm products. We need trained and educated leaders in every department and on every committee delegated to look after specific work outlined for immediate or future solution.

What we as farmers need is a definite agricultural policy and program. We think we are going to make headway along this line through the Farmers' Federation. When we consider that the American Farm Bureau Federation, numbering over a million farmers, has been in existence less than two years, and that this national organization has been built up from the rural town-

ship as the unit, we know that there is an awakening of our farmers to a realization of a clear cut policy and a very definite program upon which they must unite.

Responsible for Service.

You will be called upon to assume your responsibilities in co-operation with the forces already at work. Our rural schools need trained vocational teachers. Here you will be able to reach that boy and girl who cannot afford to go to college, but who can get a better training and a broader vision of a more profitable and more satisfying life on the farm and in the rural community from you. We need this vision in our schools and in our farming communities. Our teachers, county agents and club leaders have unlimited opportunity for service along this line. The success of the whole Farm Bureau movement is most vitally hingeing on this one phase of its program.

To the men and women of our college who are going out over the State to take up their life work as farmers and home makers in their old home neighborhoods we charge you with very heavy responsibilities, that of using your training and education not solely for selfish ends, but for the active co-operation with leaders in your respective communities in making your township and county efficient and well articulated parts of the State and National Federation. You will not be concerned wholly with the maximum production of food, but in the orderly and economic marketing of the same from the standpoint of the welfare of the consumer as well as the producer.

The Federation.

Our Indiana Federation of Farmers' Associations was organized on March 25, 1919. It was started without funds and without membership and has stood the strain of organization and today finds every county in the State organized and co-operating with the State Federation. Not all of our counties are as strong as they should be. Do you know how your county stands as a component part of the State Federation? If not, will you not help in getting your township and county to come up to expectations? We have the active financial and moral backing of over 70,000 farmers of Indiana. We should have every farmer in this work. If the farmers do not unite for social and economic justice they will never secure it, for we know of no one or any group that is going to get it for them.

First get posted on what the Indiana Federation of Farmers' Association is, and what it is trying to do for the farmers of the State. We will not try and tell all the work the Federation has done or is trying to do, but will just mention the various committees charged with the solution of their respective problems.

We have our own monthly publication, the Hoosier Farmer Organized, which has a monthly circulation in Indiana of 100,000 copies. Through this official organ we keep our membership informed on the policies and activities of the Federation. We also have a general publicity department.

We have a Live Stock Committee, a Federation representative at the Indianapolis Stock Yards, a Dairy Committee, a Grain Marketing Committee, a Federated Marketing Service, which is a co-operative affair in which we have joined forces with the State Grange and the Farmers' Grain Dealers' Association of Indiana, in the purchasing of farm supplies and the co-operative marketing of grain; a Wool Committee, Committee on Organization, Fruit Growers' Committee, Canners and Canning Crop Committee and a Legislative Committee. To read over the list of the activities of the Federation is to realize that all of these committees have real work to do. Each committee needs the active co-operation of every farmer in the State in the solution of these problems.

I wish you all real joy in your work and welcome the Purdue graduates into full and active fellowship with the Indiana Federation of Farmers' Associations. There is some real history being made every day in Indiana and American agriculture.

APPLE CROP PROSPECTS.

Mr. Cullinan of the Horticultural staff recently expressed a favorable opinion of the Indiana apple crop for 1921. He says that the State, as a whole, will have 40 per cent of the 1919 crop and 20 per cent of the 1920 crop. This is a great deal more than early predictions forecasted. The bulk of the southern crop will be Rome Beauties, while the northern half of the State will have a fair crop of all varieties. This crop should be of excellent quality and bring a fancy price.

Cattle Feeding at Purdue

By F. G. King,
Associate in Animal Husbandry.

CATTLE being fattened for market have been fed at Purdue Experiment Station every winter for the last fifteen years. During twelve of these seasons the feeding has returned a profit and in three years, including the last two, there has been a loss. But the good cattle feeder looks on the business as a part of his farming operations the same as his crop rotations, in that the most satisfactory results are secured when a well considered and carefully planned system is consistently followed. The feeder who follows the business every year instead of trying to be in on good years and out on bad with great danger of making the wrong choice of years, finds his crops better and his land more productive than the irregular and inconsistent operator. The work at Purdue has been a good example of consistency in cattle feeding operations and shows an average profit on the best rations including good and bad years. But the principal object of the feeding tests has been to show for the benefit of the farmers of the State the relative value of different rations for fattening cattle. One trial will not give accurate data because all cattle do not respond in the same manner to different rations. Enough trials must be made to give a representative average.

The results obtained in the steer feeding experiments that have been carried on at Purdue for the past fifteen years have been accepted as exceptionally reliable by many well known authorities and writers on this subject. Professor King of the Animal Husbandry Department gives a report of the past winter's feeding.

A test was completed April 25th with seven lots of cattle containing ten animals each. The cattle were purchased in Chicago December 4, 1920, at a price of $7.25 per hundred pounds. When the trial started December 16th the cattle averaged approximately 850 pounds in all lots and cost $7.75 per hundred pounds. The object of this test was three-fold: first, to test the value of silage made from corn and soybeans as compared to silage from corn alone; second, to test the value of cottonseed meal in rations containing silage; and, third, to secure information on the most economical amount of corn in rations for fattening cattle.

Secure Interesting Results.

Corn-soybean silage has been favored by many cattle feeders because soybeans contain a large per cent of protein in which corn is lacking. Some method of growing the protein needed for fattening farm animals is highly desirable and corn-soybean silage seemed to offer a means of meeting this need. The results secured in the test are most interesting. When fed with clover hay and a grain ration of corn and cottonseed meal, corn silage produced 2.72 pounds of gain daily per head at a cost of $10.39 per hundred pounds as compared to 2.71 pounds daily gain at a cost of $10.41 per hundred pounds when corn-soybean silage was fed. The value of the cattle was $7.45 in both lots. It is evident that when fed in combination with corn and cottonseed meal there was little difference in the feeding value of the two kinds of silage. This agrees with three previous trials with similar rations, the average of which showed no difference in the feeding value of corn-soybean silage and corn silage.

Additional tests of these two kinds of silage were made in which cottonseed meal was not fed. The recent test showed that the cattle receiving corn-soybean silage had made an average daily gain of 2.31 pounds at a cost of $9.72 per hundred pounds. The cattle fed corn silage made an average daily gain of 2.27 pounds per head at a cost of $9.77 per hundred pounds. The former lot of cattle were valued 25 cents per hundred pounds more than the latter. The loss per steer fed corn-soybean silage was $7.75 as compared to $11.05 per head with corn silage. This would in itself indicate a greater feeding value for corn-soybean silage when not fed in combination with cottonseed meal. Previous trials must be considered before conclusions are drawn. Of three previous trials with similar rations, two re-

sulted in faster and more economical gains with corn silage. The average of the four trials show very little difference in the feeding value of the two kinds of silage either in rate of gain cost of gain or finish of the cattle.

From this series of trials, involving four season's tests and sixteen lots of cattle, it is apparent that there is little difference in silage made of corn alone and silage made of corn and soybeans.

sults produced. Three of five previous tests have shown that cottonseed meal added to the ration has increased the rate of gain, decreased the cost of gain, improved the finish of the cattle and increased the profits. Two trials have shown no improvement in the rate of gain, an increase in cost of gain and a reduction in profit from the addition of the cottonseed meal. These inconsistencies may be explained by the way that droves of cattle respond to different rations.

Open sheds used in cattle feeding experiments at Purdue.

Different Rations Compared.

The comparison of rations containing no cottonseed meal with those containing this product, is one of a series designed to give conclusive results on the subject. In the test just completed, cattle fed corn, corn silage, clover hay and cottonseed meal gained 2.72 pounds daily per head at a cost of $10.39 per hundred pounds. After being fed this ration for a period of 130 days the cattle were valued at $7.45 per hundred pounds and showed a loss of $9.65 per head including the pork produced from the waste. Cattle fed corn, corn silage, and clover hay but no cottonseed meal gained 2.27 pounds per head daily at a cost of $9.77 per hundred pounds. They were valued at $6.95 per hundred and returned a loss including pork produced of $11.05 per head.

Results Are Consistent.

Tests of a similar nature in previous years have not been consistent in the results produced. Three of five previous tests have shown that cottonseed meal added to the ration has increased the rate of gain, decreased the cost of gain, improved the finish of the cattle and increased the profits. Two trials have shown no improvement in the rate of gain, an increase in cost of gain and a reduction in profit from the addition of the cottonseed meal. These inconsistencies may be explained by the way that droves of cattle respond to different rations. Despite conflicting results in different tests, the fact should not be overlooked that in four of six trials, the use of cottonseed meal was beneficial in every factor affecting the economy of cattle feeding.

Corn as a Fattener.

Tests to determine the most profitable amount of corn to feed to fattening cattle involve many factors, chief among which are the supply and price of corn, the quality and weight of cattle fed and the demands of the current market for finished cattle. Necessarily the economic conditions of the time affect these factors and make definite conclusions difficult. In the test recently concluded, cattle fed all the corn they would eat in combination with corn silage, cottonseed meal and clover hay, made an average daily gain of 2.72 pounds per head at a cost of $10.39 per hundred pounds. They were valued at $7.45 per hundred pounds and returned a loss including pork of $9.65 per

head. Cattle fed a ration of one-half feed of corn with the other feeds according to appetite gained 2.36 pounds daily per head at a cost of $11.04 per hundred pounds. Such cattle were valued at $7.10 per hundred pounds and returned a loss including pork at $14.69 per head. Cattle fed corn silage, cottonseed meal and clover hay (no corn) gained 2.28 pounds daily per head at a cost of $10.66 per hundred pounds. They were valued at $6.95 per hundred pounds and showed a loss of $16.39 per head. These results are typical of four previous trials in which cattle receiving a full feed of corn made sufficiently rapid gains and acquired a good enough finish to return the largest profit in three times out of four. In the five year series, the full fed cattle were most profitable in four trials. In the other trial, the cattle receiving no corn were most profitable. This indicates that with the quality of cattle fed under the conditions as they have prevailed in the last five years the full feeding of cattle was most likely to return a profit.

Another practice often followed is to withhold corn during the early part of the feed and full feed corn for a short time at the close of the period. A lot of cattle fed no corn for 80 days and full fed for 50 days gained 2.66 pounds daily per head at a cost of $9.67 per hundred pounds. They were valued at $7.20 per hundred pounds and returned a loss of $9.42 per head. This ration has been tested in seven trials and has proved to be of very nearly the same value as a full ration of corn during the entire period. If the feeder desires to save corn, this series of trials indicates it to be a better practice to feed no corn during the early part of the feeding period and then full feed rather than feed a limited amount during the entire time the cattle are on feed.

The sooner you teach that colt to lead, the less persuasion it will require.

Hogs following the cattle in feed lot constitute a principal source of revenue.

"Somebody has figured that a farmer's wife earns $4,004 per year. But not until she gets it will the town wife urge her husband to take up farm life."—Toledo Blade.

Although spraying is one of the most expensive orchard operations, the value of the crop is so greatly increased thereby that it is a comparatively small investment, the expense amounting to only a fraction of the returns directly due to the practice. Orchard spraying is, in fact, an excellent cheap form of insurance.—Hoosier Horticulture.

Dr. Warder, formerly a noted physician of Cincinnati, Ohio, and a prominent horticulturist in his day, once said, "All the money expended in educating the taste of the people for fruits and flowers is saved many times from the appropriations necessary for prisons, poor houses and asylums." Horticulture promotes the health, happiness and morals of the people.—Hoosier Horticulture.

The 1921 Round-up

By George Fross, '24.

"INDIANA has a bigger and more successful entertainment for her Boys' and Girls' Clubs than has any other State in the Union," said national club leaders from Washington immediately after the 1921 Round-up, which was held at Purdue on May 3, 4, and 5 of this year.

Many State club leaders and workers expressed amazement at the size and success of the Round-up, and were pleased with the results obtained.

Thirteen hundred persons attended the Round-up this year, according to the official records. This does not include a hundred or so persons who did not register. Of the total number registered, 597 were girls, 61 women, 101 men, and 541 boys. This attendance breaks all previous records and sets a new high mark for the round-ups.

The Round-up in this state is as big as it is and as successful as it is because the central office encourages all club members to attend, instead of choosing a few to attend the Round-up. The responsibility is in the hands of the local club workers and the chaperons, and does not rest on the shoulders of the State workers.

In other states a few club members are chosen to attend the Round-up, and are in the care of representatives of the State Club Leader from the time they board the trains to leave for the Round-up until they return home. This plan limits the number of boys and girls who attend the yearly entertainments and places the Round-up on a much smaller scale. The Indiana plan is attracting much attention and favorable comment. Mr. Plamer, State Club Leader of Ohio, said after attending the Round-up at Purdue: "You are doing great work—and are having much success. I never saw anything like it."

Mrs. Helen Tucker, of Cleveland, Ohio, expressed her amazement at the number of people at the Round-up and the way the program was carried out.

Miss Gertrude L. Warren, National Leader of Girls' Club work, said: "No other State is doing such wonderful work in these contests as you are doing in Indiana." Miss Warren made an interesting address to the girls at the Round-up.

Professor Z. M. Smith expressed satisfaction with the results obtained and with the record attendance.

"I was especially well pleased with the spirit of earnestness manifested by the boys and girls and their chaperons," he said.

As in all previous years the officials of the Round-up had the full co-operation of every department in the University. Not only the school of Agriculture, with its many departments, but also the Engineering schools worked with the State leaders to entertain the boys and girls.

The schools of Engineering held an open house for the club members on Tuesday night as the first official entertainment on a varied and interesting program.

The Chemistry, Physics, Electrical, Mechanical, and Civil Engineering buildings, the machine shops and foundry were brilliantly lighted and full of novel and interesting features. The guests were startled by chemical light bombs, amazed by a wireless light, spellbound at seeing their own voices, thrilled by an electric discharge of 30,000 volts, and astonished at the great range and capacity of the Engineering schools. One surprise after another kept the boys and girls, and the "grown-ups" who accompanied them, busy for the evening and started the three-day program well.

The remainder of the program was filled by the School of Agriculture, except for a play, "A Practical Theory," which was given Thursday night by the Purdue Dramatic Society.

The Purdue Egg show was held during the Round-up week and furnished an interesting entertainment for the visitors.

The Purdue Egg show is the greatest show of its kind in the country, if not in the world. Over seven hundred dozen eggs were on display and hundreds of dollars in prizes were awarded. Many of the entries were made by Students of Indiana high schools and public schools.

Much interest was shown in the many judging contests that were held for both the boys and the girls. For the latter, contests in bread judging and canned products judging were held. The boys entered in beef cattle judging, swine judging and dairy judging contests.

The Grant County team, composed of Walter Van Brock, Kenneth Boxall and Joyce Fenstermaker, won the corn judging contest, having a score of 88.1, which was the highest score made in the five sections. Edward Knapp, of Clinton County, had the highest individual score, 96.4.

The Scott County team of girls won the garment judging contest with a score of 98.2, and the Carroll County team, with a score of 95.5, won in the bread judging. The first place in the canned products judging was taken by the Warrick County team, with a score of 92.4.

The beef cattle judging contest was won by the Clay County team. William Day, of Scott County, was the highest individual scorer, with a score of 186 out of a possible 200.

The Montgomery County team had the highest score in the swine judging contest, and Wilfred Young, Clinton County, made the highest individual score, 183.

The dairy cattle judging contest was won by the Parke County team. Kenneth Cohee, of Frankfort, was the high individual scorer.

A series of very interesting and instructive lectures and demonstrations were given. President W. E. Stone, Dean J. H. Skinner, Prof. Z. M. Smith, Miss Anna Cowles, Mrs. Virginia C. Meredith, Miss Grace L. King, Miss Gertrude L. Warren, E. L. Austin and C. L. Burkholder were some of the prominent speakers.

The demonstrations covered almost every field of agricultural work and were well attended. Playtime was observed each day at 4 p. m. under the direction of Mr. M. L. Clevitt of the Department of Physical Education.

An egg barbecue was held Thursday evening in the grove to the west of the Purdue Farm under the supervision of Prof. L. H. Schwartz and Purdue students. Over six hundred people ate in the open, picnic style, and thoroughly enjoyed themselves.

The Purdue Band played in front of Fowler Hall after the barbecue, and later the Purdue Dramatic Club presented a two-act play, "A Practical Theory," in Fowler Hall. After the play, Margaret Christie, daughter of Director G. I. Christie, of the Purdue Experiment Station, gave a pretty vocal solo, and Miss Grace L. King gave an illustrated talk, "Looking at Ourselves."

The premiums, prizes and charters were awarded the next morning at 9 o'clock in Fowler Hall. Merle W. Kyler, winner of the Purdue Agriculturist Essay contest, received his prize, a silver loving cup, the evening before.

After some motion pictures and an inspection of the live stock at the Purdue Farm, the 1921 Round-up came to an end and the young students who had made the Purdue campus so gay during their visit left on the afternoon trains.

It is hoped that the 1922 Round-up will have as great a measure of success as this year's Round-up has had, and that the visitors will be as well entertained and show the same earnestness and appreciation as was noticed this year.

HEAVY LOSSES SUSTAINED IN EXPORTING APPLES.

As a step toward correcting faults in the present methods of handling export shipments of American apples and pears and other fruits, specialists of the United States Department of Agriculture are studying the prevailing transportation conditions. During the last few months one of these specialists accompanied a cargo of apples and pears from New York to London, and inspected other fruit cargoes upon their arrival in London and Southampton.

While foreign markets have generally proved attractive to American apple shippers, much dissatisfaction arises because of the uncertainty of transit conditions and the heavy losses suffered by the fruit. In two important cargoes during the past season this loss was more than 50 per cent, and in the total export movement of nearly 2,000,000 barrels it is estimated that at least 15 per cent of the fruit is a total loss or shows substantial deterioration with consequent loss in value.

Various factors contribute to the loss, and it is planned to inaugurate certain definite experiments at the beginning of the next season, giving attention to more careful culling of injured fruit at the packing house, better containers, prompt loading on the steamships, with special emphasis on proper loading equipment and careful handling, and proper refrigeration or ventilation en route. With careful handling at all stages the fruit should reach the European markets showing no greater damage than in the longer rail shipments in the domestic traffic.

FROST INJURY TO THE FRUIT CROP.

By H. H. Swaim,

Secretary Indiana Horticultural Society.

The success or failure of the fruit crop is frequently governed by the temperatures at or near blooming time, and each spring finds the fruit growers watching the temperatures closely. Usually these spring freezes are not severe enough to do serious damage to the crop, but most growers are pessimists at this season and imagine that each frost has ruined the crop, only to find later that there is an abundance left.

This spring was an exception and the freeze of March 29th has evidently destroyed the peaches, cherries and plums over a large section in Arkansas, Missouri and up the Ohio Valley, through southern Illinois, Indiana and Ohio. This same freeze practically ruined the apple crop over the same territory.

Further north the damage was not so great, the worst injury being to the stone fruits, the more dormant conditions of the apples saved them from serious damage. Following this disastrous freeze the first ten days of April were warm and spring-like and vegetation advanced rapidly, so that the freeze which came April 11th found the fruit in the more northerly fruit districts in about the same condition as in the south at the time of the March freeze.

The fact that the temperature did not go so low as on the earlier date prevented as severe loss through this section. The prospect now is that north of the fortieth parallel there will be nearly a full crop of apples with little or no stone fruit, southward there will be some apples in favorable locations, but the crop will be the nearest a failure for many years.

While the prospect is for a lean year for many fruit growers, it is well to remember that in the past when it has looked like a total destruction of the crop we have found that the man who continued to care for his trees the same as though he expected a full crop usually harvested a fair amount of very fine fruit which sold for fancy prices, while the man who threw up his hands and quit had nothing at harvest time. Moral: Don't be a quitter.

The latest type of elevator is run by suction. So are a lot of other things.

THE ROUND-UP PICTURES.

On the opposite page is shown a few of the pictures taken at the 1921 Boys' and Girls' Round-up. They illustrate some of the activities which were arranged for the students, but we could not attempt to cover the entire Round-up.

The picture at the top of the page, and to the right, was taken during the canned products judging contest, which attracted a great deal of interest among the girls. Directly below is the cast of the play, "A Practical Theory," which was presented by the Purdue Dramatic Society. It includes eight members of the cast, the coach, Mr. R. A. Cordell, of the English department of Purdue University, and George Fross, the author of the play.

The small picture in the center is that of Merle W. Kyler, a student of the Columbia City High School, who is the winner of the sweepstakes prize of the Purdue Agriculturist Essay contest this year. The cup which he is holding is one of the prizes which he received for his essay.

The Grant County Corn Judging team is the one to the left of Mr. Kyler's picture. This team, composed of Walter Van Brock, Kenneth Boxall, and Joyce Fenstermaker, won the sweepstakes cup in the State Corn Judging contest.

The girls' team, to the right, is the winner of the Demonstrations contest. From left to right they are: Bertha Cripe, Gilvia Watkins, and Marjorie Pease, all of Goshen, Ind.

The two lower pictures are, from left to right, the Brazil High School band, and one of the display rooms in the Purdue Egg show. The Brazil band, of twenty-five pieces, was one of the features of the Round-up, and furnished some good music for the egg barbecue.

The egg show was a source of interest to the boys and girls, and many of them entered in the guessing and egg judging contests which were held by the show. The Purdue Egg show is the biggest of its kind in the country, if not in the world. The picture shows the smaller of the two display rooms.

If we had the room we could print a hundred pictures as interesting as this, showing the happenings at the Round-up, which was the largest ever held in the State.

CLUB ROUND-UP 1921

Essay Contest

Merle W. Kyler, of Columbia City, is the winner of the Purdue Agriculturist Prize Essay Contest for 1921. His essay, "Better Dairy Cattle, the Hope of America," won first prize in the Dairy Department of the contest, and won the sweepstakes prize in competition with five other essays, winners in the departments of Poultry, Animal Husbandry, Agronomy, Entomlogy and Horticulture, and General and Farm Management.

The essays received in the contest were exceptionally good in rhetoric, subject matter and organization. Indeed, some of the judges, all of whom are professors in the Purdue School of Agriculture, expressed great satisfaction with the winning essays, saying that they were good enough to have been written by college men.

The writers of the essays are to be congratulated on the high quality of their work, which is a credit to the public schools of the State. If the contest serves no other purpose, we will be satisfied to advertise this exceptional work of Indiana High School students.

However, the contest is doing more than that. It is helping the High School students to gain a more thorough knowledge of modern agriculture, and special branches of agriculture in which they are interested.

During the next year, in the 1922 contest, girls will be enabled to compete in a newly made division of the contest—the Home Economics branch. This branch will be divided into sections as is the Agricultural Vocational Department, and prizes will be awarded in a similar way. The same set of rules will apply to both branches of the contest.

Quite a rivalry between the boys and girls is to be expected, and it is a question as to which branch of the contest will produce the better essay.

Prizes for the winners in the 1921 contest will be announced in a letter to be sent to all contestants. All schools which entered 100 per cent of their students will be awarded a year's subscription to each of three farm journals. A silver loving cup, donated by the Purdue Agricultural Society, is the sweepstakes prize. Four yearly subscriptions to farm journals will be given to each first prize winner, and two to each of the second and third prize winners.

Two excellent books on dairying, donated by John Wiley and Sons, publishers, of New York, and a Purdue pennant, donated by Ray Southworth, of West Lafayette, also go to the sweepstakes winner, Mr. Kyler.

The winning authors and their High Schools are as follows:

Sweepstakes—Merle W. Kyler, Columbia City, Ind.

Animal Husbandry—
1. Clarence Rogers, Pendleton, Ind.
2. James L. Kellerman, Romney, Ind.
3. Vernon Taylor, Mooresville, Ind.

Dairy—
1. Merle W. Kyler, Columbia City, Ind.
2. Wallace M. Weber, Greenfield, Ind.
3. Ralph McCardle, Aurora, Ind.

Poultry—
1. C. B. Libbert, Aurora, Ind.
2. Guy Napier, Scottsburg, Ind.
3. John Wood, Delphi, Ind.

Agronomy—
1. Homer Crandall, Mt. Summitt, Ind.
2. Richard Peden, Spencer, Ind.
3. Samuel Funk, Stockwell, Ind.

Horticulture and Entomology—
1. Virgil Miller, Winchester, Ind.
2. Howard Cain, Mt. Vernon, Ind.
3. William Porter, Bargersville, Ind.

General and Farm Management—
1. Mahan Hendricks.
2. Loyd Sackmire, Kingman, Ind.
3. Robert W. Mounts, Stockwell, Ind.

The winning essays will be printed in several farm journals. The sweepstakes essay is printed in this issue of the Agriculturist.

Certain insects, notably the plum and quince curculios, may be reduced in numbers by regularly jarring the trees in early spring, collecting the insects as they fall on sheets or special cloth-covered frames.

As yet the soy-bean is troubled by few serious enemies. In general it may be said that no insect or fungous pest has assumed any great economic importance in connection with the culture of this crop in Indiana.

In a large area of this country where the Hessian fly is a destructive pest, losses in certain years could be avoided if a part of the crop were rye instead of wheat.

Better Dairy Cattle, the Hope of America

By Merle W. Kyler, of Columbia City.

"BETTER Dairy Cattle." What do I mean by those few short, seemingly insignificant words?" Shall this short article simply tell the need of better dairy cattle and that only? No, for then this article would be of little or no good. Nearly every man knows that the country needs better dairy cattle and, that he needs them. So the question to him is not as important as the question, How am I going to get better dairy cattle?

Merle W. Kyler, winner of the Agriculturist Essay Contest, has for several years kept careful records on his father's herd of Jerseys, and is an enthusiastic young dairyman. He includes in this essay some of the interesting results obtained in their herd.

Now, the purpose of this brief article is two-fold. First, to show how greatly we need better dairy cattle; and, second, to tell the only safe, sane and practical method of obtaining them. So that when these two purposes have been fulfilled, I shall consider that this short article has fulfilled the mission which I intended for it.

Why do we need better dairy cattle? The answer is for the benefit of the dairymen. And by this I mean both the direct and indirect benefits that would be derived from better dairy cattle. Now let us see what some of these benefits are. The cost of feeding a cow that will produce three hundred pounds of butterfat in a year is but slightly higher than the cost of feeding a cow that will produce two hundred pounds. This fact can be well illustrated from my father's herd of grade and pure-bred Jersey cattle, on which I have kept production records for several years.

Now let us take two cows from that herd. For convenience we will call them No. 1 and No. 2. They were both seven years old and cared for under exactly the same conditions. But during the year cow No. 1 produced 307.6 pounds of butterfat and cow No. 2, 201.1 pounds of butterfat. The feed cost for cow No. 1 was $94.66 and the feed cost for cow No. 2 was $90.75, an increase of only $3.91 over cow No. 2 in the feed cost. Now cow No. 1 made a net profit of $125.91 and cow No. 2 a profit of $56.58, or No. 1 made $69.33 more than No. 2 after the extra cost was subtracted. Now if a man had ten cows like cow No. 1, they would be worth exactly $693.30 more per year than the same number of cows like cow No. 2.

Conditions in the farming sections of the world are becoming more and more trying. Land is continually rising in price and the margin of profit is becoming smaller. With these conditions men are turning their attention to dairying. This fact has been proven in New York, Wisconsin, Minnesota and especially in the country of Denmark. Denmark is a good example to study. In 1895 the first Danish cow testing association was organized because they realized that in order that the dairy business might be profitable they must have better cows. Since 1895 they have raised their production to 275 pounds of butterfat per year, while in America it is only 160 pounds of butterfat per year, or 115 pounds less than that of Denmark. Now we know that Denmark can buy our feed, ship it over there, feed it to their cows, then ship the butter back to America and still undersell the American producer ten cents per pound. Why is this? Simply because they have so much higher average production than we do. Therefore the only way we can compete with the Danish butter producer is to produce our butter at a lower cost and to do this we must have better cows.

In 1910 the average butterfat production in the United States was 150 pounds and in 1920 it was 160 pounds. This makes an increase of about ten pounds, or about one pound per year. Now supposing that Denmark's production is left the same as it is for the next 115 years and that our own production increases at the same rate, then it would take the United States 115 years to reach the present standard of Danish production, and by the time that period was over the American producer would probably be forced out of business.

Now I have shown that we must increase our average dairy production for the following reasons: first, because it will mean a larger direct profit to you, the producer; second, we must increase it because of Danish competition; and, third, if we do not increase our average butter production the Danish producer by underselling the American producer will force the American out of business.

Now that we have seen the great need of better dairy cattle the next question which comes to our mind is, "How are we going to get them?" How are we going to make up this deficiency of 115 pounds per cow? Shall we go to the breeders such as Hood Farm or Carnation Stock Farm and buy a herd of good cows? No, for this would be merely changing the ownership of the good cows and not increasing the average production. I do not mean that a person should not buy good cows from the breeders, but that the average farmer cannot afford to pay $500 or more per cow, for a herd of from five to ten cows, for this would mean an expenditure of from $2,500 to $5,000 for a very small herd. Then, the only method left is to raise them yourself and this can be done only by better breeding and better feeding.

Now the subject of better breeding can be divided into two main divisions, heredity and environment. First, let us consider the part played by heredity. What is heredity? It is the tendency of plants and animals to transmit their characteristics to their offsprings. Heredity is for convenience divided into several parts or rules, which are known as the laws of breeding, and must be taken into consideration by every practical breeder. First, and of primal importance, is the law that like produces like or the likeness of some ancestor. Thus you see in mating two animals the offspring is nearly sure to resemble them or their ancestors. This also shows why it is not sufficient for the sire and dam of an animal to be good but that their ancestors must also be good. Then there is the law of reversion or the tendency of animals to revert back to some distant ancestor. This is a very disappointing law because in mating very good animals, one may get a very poor offspring by reversion back to some ancestral type which is not desirable. This emphasizes the need of a pedigree that has several generations of good animals, thereby lessening the danger of harmful reversion. The next law to be considered is the law of mutation. It is the tendency of plants and animals to take a certain form that is not common to that class of animals. It is not as important as the other laws, but still it makes its appearance occasionally in the form of three-legged chickens and other equally unexpected forms.

But these are the principles of animal breeding, in which, as in any other subject, the principles must be learned first and their application second. Now since we have learned the principles of breeding we must learn their application next.

The bull is said to be one-half of the herd. Therefore if you use better bulls you have gone half way in improving your herd. We know that like produces like, so if we have a bull that is a good individual and backed by lines of high producing animals, why will not his daughters be higher producers than the daughters of a bull that is a poor individual and is backed by a long line of non-producing scrubs? Then your bull must not only have good individuals in his pedigree, but every animal in his pedigree must be a good, high producing individual. Then there will be but little chance of reversion destroying the work of many years.

It would be best, of course, if every man could own a good bull, but it is not always necessary. So there has been an alternative offered in the form of bull associations. In these organizations a number of farmers go together and buy a good bull. This is an excellent plan because many men can obtain the service of a good bull at a very moderate cost.

I said the bull was half of the herd, but he is really more than half, because by using pure-bred bulls you will get the following results:

First cross.....50 % pure-bred,
Second cross.....75 % pure-bred,
Third cross.....87½% pure-bred,
Fourth cross.....93¾% pure-bred,
Fifth cross.....96⅞% pure-bred.

By this table one can see that in five crosses only 3⅛ per cent of the scrub blood would remain. But we want this 3⅛ per cent to be as good as it can be, and as the average man dose not think he can afford

(Continued on page 416)

The Purdue Egg Show

The 1921 Purdue Egg show sets a high mark for shows of its kind, with 700 dozen eggs competing for places in six classes. The Purdue Egg show was the pioneer of its kind in the country and now ranks as the first. The show was so much greater this year than last that additional space in the agricultural building was needed to house the exhibits.

The winning exhibitors in each of the classes are as follows:

University and Experiment Station Class—The University of Pennsylvania, sweepstakes. Score, 98¾. White eggs.

Students' Class—L. B. Folk, Sophomore, sweepstakes of division excluding students in Poultry 1. Score, 97¼; brown eggs.

The contrast in the awards of a few years ago, as shown above, with those of this year show the growth of the Freshman Egg show.

The Jonas Meier Poultry Farm of Indianapolis, Ind., won the grand sweepstakes of the show with an entry of "extra" whites, which scored 98¾. This entry was made in the Commercial Class. The winner in the Fanciers' Class was Langeman Bros., of Elmont, Mo.

Sweepstakes in Poultry 1—J. H. Armstrong. Score, 98; white eggs.

Faculty Class—Prof. F. E. Robbins. Score, 98½.

Commercial Class—Sweepstakes, Jonas Meier Poultry Farm. Score, 98¾; "extras" white eggs.

Fanciers' Class—Sweepstakes.

Boys' and Girls' Class—Sweepstakes in the High School section, Frank Stephens, Mooresville. Score, 97⅞; brown eggs. Sweepstakes, Grade School section, Russel Moorhouse, Brookston. Score, 97¾; brown eggs.

Hundreds of visitors were entertained at the show. An open night was scheduled for Wednesday, May 4, at which time the Purdue Poultry Club gave a demonstration of modern poultry methods and of the prevention and cure of poultry diseases.

Dozens of interesting exhibits were on display throughout the entire show, and illustrated the work that is being carried on by the various departments of the University.

A number of judging and guessing contests were staged with great success. W. R. Amick, a Freshman, won the egg judging contest, in which many entries were made. One of the most interesting contests was that of guessing the number of eggs which would be broken out of 48 in a basket dropped from the roof of the Agricultural building. Thirty-seven were broken this year. At a previous show not one egg was broken.

The Purdue Egg show is managed by the Freshman class in Agriculture, through a committee of eight men elected by the class. The committee in charge of the 1921 show is as follows:

C. W. Jackson, president; C. C. Hadley, vice-president; W. P. Watson, secretary; W. R. Amick, treasurer; W. J. Emerson, superintendent; F. C. Miller, assistant superintendent, and George H. Fross, publicity manager.

Over five months work on the part of the committee was necessary to make the show a success. Election to the committee is the greatest honor that a Freshman in the School of Agriculture can have.

HORTICULTURAL SHOW NOTES.

By the Manager, R. Magruder.

The Seventh Annual Horticultural Show is to be held this year November 11-14th, and instead of being simply an apple show, is to be a combined apple, vegetable and flower show. The officers of the show have been elected and the work is well under way.

The apple department is being enlarged considerably this year, especially the commercial class. As there will be no State apple show this year the commercial growers of the State are expected to show a large amount of fruit.

The vegetable department, which is new this year, has classes open for the commercial growers, high and vocational school students and University students.

The flower show is already firmly established and draws large crowds every year.

A preliminary premium list will be sent out this spring and the regular list will be mailed early in the fall. A large number of valuable premiums will be offered.

PURDUE INSTRUCTOR MAKES USEFUL INVENTION.

Dr. E. G. Campbell, Professor of Agricultural Botany at Purdue University, has just announced the invention of a unique pocket dissecting scope. Compactness is the outstanding feature of this instrument, which includes dissecting needles, lens, and all necessary articles for field or laboratory work enclosed in a small holder resembling a fountain pen.

Word came from Washington January 25th that the device was patentable. A representative of Bausch & Lomb Optical Company has interviewed Dr. Campbell relative to producing the instrument for the public.

According to Dr. Campbell, the purposes of the invention are two-fold, namely: To promote effective work in the laboratory, in that the object to be dissected can be held firmly in focus, revolved, and inverted with perfect ease; and it is convenient for students and nature lovers, inasmuch as the whole mechanism, including dissecting instruments are included, when not in use, in a small tube that may be carried in the pocket like a fountain pen.

The number of pigs born dead, plus those dying before weaning time, equals a large per cent of the total pig crop. Better care of the pregnant sows would prevent many of these casualties. Don't expect the brood sow to maintain herself on pasture alone and then produce a large, healthy litter in the fall.

The Chinch Bug—A Serious Wheat and Corn Pest in Indiana This Year

By I. E. Parett, '22.

THE fact that the chinch bug has been gradually spreading and increasing in Indiana the past few years and the further important fact that they passed the last winter with less than one per cent mortality, makes this insect one of great importance to the Indiana farmer. The bugs have now left their hibernating quarters to lay eggs in wheat and other small grain fields and nothing can be done at present to effect their control. However, it is possible to protect corn, Indiana's most important grain crop, if the problem is given early attention and preparations and plans made accordingly.

Life cycle of Chinch bug.

To be able to recognize the insect, its injury, and to have a full understanding of the life history and habits are of equal importance to the agriculturist in formulating and planning control measures.

The chinch bug feeds on the sap of grass-like crops such as wheat, rye, timothy, corn, sorghum, wild grasses and similar plants. Sucking the plant juices causes the plant to appear stunted, unhealthy and weakened, usually resulting in wilting or total death when the infestation is bad. This insect can be readily detected in the field by examination of the base of the plant stalk.

Description of Insect.

The adult bugs are about one-eighth inch long, black with whitish wings, both of which are ornamented with a black triangular spot at each side. The young bugs are of a pale yellow color, but in a short time become bright blood red. As the insect develops the red soon becomes bright vermillion with a pale yellowish band transversely across the body. The eggs which are laid on the roots or at the base of the plant are each .03 of an inch long and elliptical in shape. When newly laid the egg is whitish in color and partially transparent, but it soon becomes yellowish and later distinctly reddish as hatching time approaches.

Life History.

The chinch bug hibernates as a mature insect in woods, under leaves, in corn shocks, bunch grass or other places affording adequate protection. This spring about the middle of April the bugs left their winter quarters and flew to wheat and other small grain fields to deposit eggs for the first seasonal generation. The parent bugs are active, laying eggs about wheat, barley and other plants until the middle of May, when they die. The young hatch from these eggs mature about harvest time and move into the corn field on foot, where they suck the plant juices and do extreme damage to the crop. After a short time wings are developed, allowing the bugs to scatter over the entire neighborhood. Eggs for the second generation are laid at the base of the corn plants, hatch in late July or August, and young from these mature, hiding over winter to start trouble again the next spring. Thus there are two generations each season.

(Continued on page 414)

Gives the farm a modern bath room

Running Water Does Not Freeze—Keeps Stock Healthy

Plenty of Hot Water for Washing Clothes

SWARTZ-LIGHT "It Saves Mother"

Reg. U. S. Pat. Office

Makes it easy and quick for her to wash the clothes. Takes all the back breaking, disagreeable work out of it. Simplifies dish washing by supplying running water—hot and plenty of it. Gives you all a modern bathroom—ready in an instant for use. Permits the use of hose to water the garden. No more pumping and carrying water.

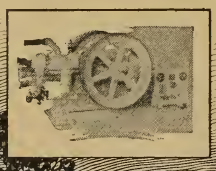
"Come to our Factory—it will pay you"

BEATS ALL COMPETITION IN OHIO STATE UNIVERSITY TEST

The Agricultural Engineering Department of the Ohio State University invited 21 different manufacturers of electric light plants to enter their products in a series of tests. Only five companies responded—sixteen made excuses. Out of the five entries one withdrew when the test was started.

Swartz Lighting Plant won first award in low cost of operation. Its cost was 6.47 cents per KW hour. Four of the contesting plants used kerosene. Swartz Light used gasoline.

The Swartz-Light Plant won first award in the low speed test. It won first place in ability to carry its load. It was the only plant in the contest not bolted to a concrete base and its vibration was the slightest. This contest was held in the interest of the farmers of Ohio by Prof. F. W. Ives, of Ohio State University. Write us for a copy of the test.



Desirable Territory Open to Active Dealers

SWARTZ-LIGHT

Unequaled for simplicity, durability and low cost of operation.
Built by Swartz Electric Company.
Sole owners of all patents and rights.

SWARTZ ELECTRIC CO.,
Oldest exclusive makers of electric light and power plants for farm homes, city homes and business houses.
Factory, Speedway.
Branch, 5 N. Meridian St., Indianapolis, Ind.

Another Swartz-Light Triumph

Read what this remarkable lighting plant did in a fair test, conducted by college authorities. Swartz-Light won first rank for low cost of operation—decide for yourself which you should buy. Write us for other interesting details.

RESULTS OF FARM LIGHTING PLANT TESTS UNDER RATED LOAD CONDITIONS

Conducted by the Department of Agricultural Engineering, Ohio State University, February 7, 8, 9, 1921.

Of 23 Makers Invited to Participate, the Following Firms Only Reported for Tests:

	Name of Plant	Mfrs. rating at time of test—watts	Mfrs. new rating Feb. 12, 1921	Rated speed	Average observed speed	Hours on test	Average watts	Total watts	Kind fuel used	Pounds fuel used	Gallons fuel used	Fuel consumed per kw. hour		Cost fuel per kw. hour—cents	Amount lubrication oil used—total gal.	Cost of lubrication oil per kw. hr.—cts.	Total cost oil—fuel per kw. hour—cts.	Cooling system used	
												Lbs.	Gals.						
1	Delco	750	600	1500	1577	28	680.80	19062	Kero	37.59	5.57	1.972	.292	5.84	.18	1.18	7.02	Air----	1
2	Delco	1000	850	1150	1157	28	892.00	24976	Kero	44.19	6.55	1.769	.262	5.24	.34	1.70	6.94	Air----	2
3	Delco	1250	1250	1300	1353	28	1298.70	36363	Kero	66.40	9.83	1.826	.270	5.40	.35	1.23	6.73	Air----	3
4	*Phelps	1500	----	1335	1342	28	1437.40	40247	Gas--	67.29	10.95	1.672	.267	7.48	.114	0.35	7.83	Water	4
5	Swartz	1000	----	850	928	28	1064.30	29800	Gas--	39.63	6.47	1.33	.217	6.07	.09	0.4	6.47	Water	5
6	**Willys	1250	----	1350	1332	8	1216.00	9728	Kero	15.43	2.28	1.586	.234	4.68	.237	3.05	7.73	Air----	6

*Plant appeared to be pulling rated load; later calibration of instruments showed load below rating; plant capable of pulling rated load satisfactorily.

**Machine did not run full 28 hours because of lack of proper adjustment. Not fault of machine. Test not final, as comparisons can only be made under 28 hour run, which will be run later.

Delco plants did not start tests on time because adjustments had not been made previous to time of starting.

Swartz plant did not start at scheduled time because operator was late in arriving.

NOTE—All plants on test were stock models fully equipped with muffler and regular instruments and batteries.

Data	Kero	Gas	Oil
Test specific gravity	.810	.735	
Cost per gallon	20c	28c	$1.25

DEPARTMENT OF AGRICULTURAL ENGINEERING

(Signed) F. W. Ives, G. W. McCuen, P. R. Potter, Robert R. Thompson

Swartz-Light

Unequalled for simplicity, durability and low cost of operation.

BUILT BY

Swartz Electric Company

Sole owners of all patents and rights.

Swartz Electric Company

Oldest exclusive makers of electric light and power plants for farm homes, city homes and business houses.

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THE PURDUE AGRICULTURIST

Published monthly during the school year, by Agricultural Students of Purdue University, West LaFayette, Indiana.

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The purpose of THE PURDUE AGRICULTURIST is to disseminate the latest scientific knowledge concerning Agriculture and Home Economics, to incite the young people of Indiana to a greater desire for training in Agriculture and in the industrial pursuits, to publish matters of interest concerning the Purdue School of Agriculture and the Purdue Experiment Station, and to afford opportunity to the students for training in Agricultural journalism.

THE NEW STAFF.

With this issue the new staff of the Agriculturist assumes full charge. We have gained much from the experience of the old staff, and especially are we benefited by the organization that has been perfected under the leadership of the retiring editor, P. T. Brown. This has meant a more marked unity of purpose, a larger interest in the magazine, and a consequent improvement in its content, and finally an enthusiasm for the work that has been transmitted in a splendid way to the new staff through the co-operation of the old. The outgoing staff is to be commended on the progress that the magazine has made under its direction, and its members can take with them the compensation that comes from the memory of a piece of work that has been well done.

The Agriculturist is designed to present the latest ideas in agricultural practices that are recognized as successful by the University, and it carries the news of the work of the Experiment Station and University. Its articles are written by the students, faculty, extension workers, alumni, and successful farmers, and we hope for the same co-operation from these sources that the retiring staff has received. This is the official organ of the agricultural school, for it had its origin in the agricultural society, and so merits the active support of every student and the farmers of Indiana. We will gladly receive suggestions for the improvement of the paper; we wish more student articles and especially are we interested in an increased circulation. During the summer vacation, students have a splendid opportunity to aid us in this respect by bringing the Agriculturist into their home communities, where it can place the readers in closer contact with Purdue.

We hope that the confidence of the retiring staff in the newly elected officers has not been misplaced, and that the Agriculturist will not only continue the service that it has been rendering, but will contribute to the promotion of a better agriculture in Indiana and a Greater Purdue.

THE ENGINEERING OPEN HOUSE.

In the "Engineering Open House," which is held in May each year the University has an excellent opportunity for advertising itself among the local community and among the people of the state. It is given at a time when the Club Round-Up and Purdue Egg Show are in progress, and an unusually large number of visitors over a wide territory are given an opportunity to attend. As these members of Boys' and Girls' Clubs are generally leaders in their respective communities, it is a good thing to interest them in Purdue so they will naturally turn to this institution if they contemplate a college education.

THE SALES TAX.

More than two years and one-half have passed since the Armistice was signed and the great war came to an end, but the financial problems arising from the conflict remain unsolved. Each of the belligerent nations today staggers under a load of debt and taxation. In America the debt in proportion to our national wealth is not as great as in Europe, but the taxes at present are more burdensome than they have been for many years. That we must look forward to a continued high rate of taxation is patent, though this fact is frequently ignored because of its unpopularity.

Many solutions have been offered for the nation's financial problems. The political atmosphere is full of taxes and rumors of taxes, but the one which appears to be attracting most attention at present is the proposed sales tax. Senator Smoot has just dropped the sales tax bill in the congressional hopper, and the proponents and opponents of the measure throughout the country are now being heard from.

Those who favor a sales tax claim that at the rate of one per cent it will produce all the revenue needed, that it is simple in operation, that it will abolish the present harmful method of taxation, and that under it business will promptly get back on its feet.

Its opponents say it will generally be added to the price of commodities and, since the larger proportion of the consumption of the nation is represented by the family budgets of the working class, the major portion of the tax will rest upon the mass of the people. Those concerns having many turnovers of stock during the year would be at a decided disadvantage.

The arguments pro and con must depend largely on the type of tax suggested. The principal types proposed are: a general turnover tax including capital stock, etc., a wholesale and retail tax, a wholesale tax, and a retail tax. Some plans include the taxation of farm produce when sold.

Farmers and farm papers generally have been opposed to the sales tax, the sentiment of Senator Capper expressing the views of the majority. He said, "A sales tax increases the cost of living." The farmer, however, should be open-minded and studious in his efforts to understand both sides of the argument. This promises to be one of the outstanding struggles of the session and is one of vital interest to every taxpayer.

A TARIFF ON CHINESE EGGS.

In practically every country of the world except the United States there is a scarcity of gold. In order to get gold these countries will attempt to dump their products into this country at low prices—too low for America to compete with. It was to thwart such a condition that the Emergency Tariff bill was proposed in Congress. This bill did not pass, but the Republican party is duty bound to enact a protective tariff in the near future.

In the Emergency Tariff bill no provision was made for poultry or eggs, but there is now at Washington a number of poultrymen attempting to get a 12-cent revenue per dozen on fresh eggs and a 15-cent revenue per pound on dried and frozen eggs. The poultrymen's main object in securing this tariff is for protection from Chinese eggs, 846,863 dozen of which were imported as fresh and 25,646,791 pounds as dried and frozen, during 1920.

China can produce eggs for 6 to 10 cents per dozen, since Chinese hens feed on garbage and refuse. Eggs can be shipped from China to New York by water cheaper than the Petaluma producers can ship by rail to the same market. The heavy production in China comes in April, May, and June—the same time that it does here. The Chinese egg is of inferior quality, being small, and tainted because of the poor food the hens eat.

Such competition will have a depressing influence upon the poultry industry of America. Surely the tariff is justifiable, especially since China so greatly needs eggs to feed her starving millions.

MORE ABOUT THE UNION.

The letting of the contract last month for the building plans and specifications by the committee on building and organization is the most definite action yet taken toward the erection of the proposed Purdue Union Memorial Building. This will furnish something more tangible for those that have had fond dreams of seeing the Union Buliding materialize at an early date on which to build their hopes. Pond and Pond, of Chicago, were chosen to furnish the plans.

FURNAS WINS SECOND IN TWO MILE RACE AT PENN RELAYS.

C. C. Furnas, '22, premier two-miler in the Conference, placed second in the two-mile race of the Penn relays held the 29th and 30th of April. Furnas was less than four yards behind Buker of Bates College at the finish of the race. Although the track was soggy, the time was 9:25:3.

PURDUE DOWNS I. U. ON TRACK.

In a dual meet Purdue's thinly clads romped around Indiana's track team and annexed 85½ points to the 45½ garnered by Indiana. Rohrer, Watson and Miller took two firsts each, while Furnas and Harrison won a first and a second each. Purdue has exceptional material in this branch of sport; with Rohrer, Watson and Lantz in the dashes, Harrison in the middle distances and Furnas in the distance events, Purdue has a hard combination to beat.

The football squad is showing up well in the spring workout under the tutelage of our new mentor, Coach Dietz. The men are being put through signal practice and scrimmage as well as routine drill.

1921 GALA WEEK TO BE BEST EVER.

Plans for the Gala Week festivities have been completed and consist of the most comprehensive series of events ever put on by the Alumni Association. Registration will start early on Saturday, June 4. The festivities open with a smoker at the roof garden of the Fowler Hotel Saturday evening. Various stunts and surprises are arranged for this event, making it one of the most important events on the program. Sightseeing tours and other informal sessions are scheduled for Sunday. The Country Club will be open to visitors during the day. The baccalaureate sermon is delivered at 3 o'clock the same day.

Monday morning the registration headquarters will be moved to the campus. Class reunions, et cetera, will fill the time until the Indiana-Purdue baseball game, which is called at 2:30 p. m. At 5:30 p. m. comes the annual Senior-Alumni banquet to be held in Memorial gymnasium. Plans are being made to take care of eight hundred people. After the banquet there will be a big open air concert by our justly famous band, which will be on hand in full force, so the success of this feature is assured. Then comes the big Alumni show. Everyone remembers the success of last year's "Alumni Symposium," but this year's promises to eclipse that event.

Tuesday morning will start off another reunion of the various classes. The General Alumni Association will begin its annual meeting at 10 o'clock and all members should be present to transact the important business before the organization. The crowd will then be served a campus luncheon. The big Alumni parade will start shortly after the luncheon, the attendant games and amusements will keep everybody busy during the afternoon. The Faculty reception and Senior "hop" come Tuesday evening. The entire affair will come to a fitting close with the graduation exercises in Fowler Hall on Wednesday morning.

Purdue men hold a large percentage of the County Agent positions in Indiana. Here is the list of the grads so employed: L. M. Busche, '19, County Agent of Adams county, at Decatur; C. M. Job, '17, Bartholomew county, Columbus; O. W. Mansfield, '18, Blackford county, Hartford City; W. R. Zechiel, '11, Cass county, Logansport; V. J. Mann, '15, Clark county, Charlestown; H. E. Abbott, '18, Clay county, Brazil; W. J. Berns, '19, Daviess county, Washington; C. C. Madison, '17, Dearborn county, Aurora; M. L. Shearer, '18, Elkhart county, Goshen; C. V. Watson, '17, Floyd county, New Albany; L. E. McKinzie, '15, Fountain county, Covington; V. O. Mood, '16, Gibson county, Princeton; M. E. Cromer, '14, Hancock county, Greenfield; D. M. Mawharter, '15, Jasper county, Rensselaer; H. S. Ebbinghaus, '16, Jay county, Portland; B. H. Doddridge, '15, Jefferson county, Madison; C. A. Buechner, '17, Laporte county, Laporte; J. C. Kline, '14, Lawrence county, Bedford; H. E. Ackerson, '17, Marion county, Indianapolis; V. V. Clarhe, '17, Marshall county, Plymouth; J. A. Girard, '18, Martin county, Shoals; O. E. Ackerson, '15, Montgomery county, Crawfordsville; C. C. Madison, '17, Ohio county, Aurora; J. R. Meeks, '14, Parke county, Rockville; G. O. Standley, '20, Perry county, Cannelton; A. Z. Arehart, '12, Porter county, Valparaiso; W. E. Shrode, '16, Posey county, Mt. Vernon; D. D. Ball, '17, Rush county, Rushville; H. S. Benson, '16, Sullivan county, Sullivan; R. D. Girard, '14,

Tipton county, Tipton; J. A. McCarty, '15, Vanderburg county, Evansville; H. L. Royce, '17, Wabash county, Wabash; H. H. Madaus, '04, Warren county, Williamsport; H. R. Holcomb, '20, Warrick, Boonville; R. E. Wilson, '17, Washington county, Salem; E. C. Salisbury, '04, Wells county, Bluffton; R. R. Fraser, '16, White county, Monticello; R. M. Roop, '18, Whitley county, Columbia City; P. T. Brown, '21, Benton county, Fowler.

According to a set of statistics compiled by Professor Fisher the numbers of Ag. graduates—'82 to '20—in various lines of work is as follows:

Total Alumni	885	
Dead	30	3.3%
Living	855	
No informatoin or not employed	12	1.4%
Farming	392	45.9%
Teaching, Research, Extension	254	29.7%
Commercial agriculture	97	11.3%
Not related to agriculture	100	11.7%

PURDUE R. O. T. C. IS INSPECTED.

The R. O. T. C. force was given the annual government inspection on May 2-3. Major General G. W. Read, Col. R. T. Richardson, Col. R. J. Fleming, Col. J. C. Rhea and Capt. J. W. Vann constituted the inspecting force. The officers expressed themselves as well pleased with the work of the unit. The instructional staff hope to better their distinguished record of last year.

The Union button, a gold block "P" with the word "Union" in raised letters, which is given to the members upon the first payment of their pledge, has become a familiar sight on the campus and is really becoming more conspicuous by its absence than otherwise. In fact, the Purdue Union is becoming more and more of a reality to the students of Purdue and the people of the State, as the organization as a whole is rounding into shape and is able to function more definitely and efficiently.

H. M. Gardner, '16, is instructor in the high school at Oxford, Ind. Since graduation he has spent three years in teaching and two years in the naval service.

BASEBALL TEAM PROGRESSING FINELY.

The baseball team is now under the sole guidance of "Piggy" Lambert since "Humpy" Pierce has gone back to take charge of his own team. Lambert's men have been having a busy season so far. Up to date (May 10) they have played ten games and have been chalked on the winning side five times. Five of the games have been Conference battles and the team has won two of these; a percentage of .400 isn't so bad for a team that didn't seem to be able to hit at the first of the season. Now that the team is beginning to find its batting eye things may change. The lineup has been shifted considerably since the first of the season. Wagner and Wallace still occupy the box, but just now Bill Fawcett is taking care of the receiving end, due to the fact that Hiser has a bursted finger. Morgan is filling the big hole Bill left at short very creditably and bids high for a permanent position. Stanwood, Eversman and K. Fawcett cover the outfield, with Strack, White and Strubbe playing the bags. The team has seven Conference games yet to play and is expected to win the larger portion of these.

ALUMNI NOTES.

J. L. Wann, '21, has accepted a position with the Dairy Extension Department. He will be connected with Co-operative Testing Association work.

R. W. Gregory, '18, is boosting for Purdue and in his spare time teaching Mooresville, Ind., high school.

W. W. Magill, '18, is employed in the State Department of Agriculture as specialist in marketing fruits and vegetables at Raleigh, N. C.

Karl R. Becker, '18, is director in agricultural extension, Farmers and Citizens bank, at West Point, Iowa.

H. S. Benson, '16, is county agricultural agent at Sullivan, Ind.

C. J. Borum, '16, is vocational agriculture teacher for the two West Point and Jackson township schools of Tippecanoe county.

H. F. DePew, '17, is assistant professor of Dairy Husbandry in the New Hampshire State College, where he has been located since graduation. He has charge of dairy manufacturing instruction.

WHICH WAY IS YOUR STOCK GOING?

Down With the Scrub—Up With the Pure-Breds.

SHADELAND HEREFORDS

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Woodford 8th, Woodford 71st, Disturber Magnet.
Herefords for Uniformity and Utility.
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We breed and produce the kind of animals that sire champions and sell for the top-most prices. If you are in the market for anything, or going to be, it will be to your interest to see or write me. 37 years of successful business. No other breeder can boast of such a record.

M. A. JUDY, West Lebanon, Ind.

BIG-TYPE POLAND HOGS

PICKETT AGAIN and MOLLIE'S CLANSMAN head our herd.

Our sows are the best. Several by Disher's Giant, Evolution, Big Bob Orphan and others. For sale at private treaty only. TRIED SOWS, GILTS bred or open.

BIG TYPE POLAND FARM,
Loogootee Indiana.

R. C. Arbuckle, '17, and Alfred, '17, are both farming, the former at Pittsboro, Ind., and the latter at Boonville, Ind.

H. S. Ebbinghaus, '16, is manager of ex-Governor Cox's farm at West Middleton, O.

C. G. Randell, '20, is teaching vocational agriculture at Marysville, Kan. Since he has been there he has been elected to the Kansas Academy of Science.

John A. Girard, '18, is county agricultural agent of Martin county and is living at Shoals, Ind.

M. S. Libbert, '16, of Syracuse, Ind., is raising pure-bred Jersey cattle and Hampshire hogs on the Bassett Jersey farm, of which he and Bassett are owners.

R. S. Bundy, '20, is teaching vocational agriculture at Brookston and Chalmers, Ind. He will teach there again next year.

INDIANA CATTLE FEEDERS HOLD ANNUAL SPRING CONVENTION.

The annual spring meeting of the Indiana Cattle Feeders' Association was held on April 29, 1921, at the judging pavilion on the Purdue Farm. The convention was opened by President Bennett Taylor, of Lafayette. Mr. M. H. Overton of the Extension Department made a report on the co-operative cattle feeding work in the State. The general results obtained by most farmers were not favorable, but profits were greater than those of last year. Mr. F. G. King, in charge of the cattle feeding experiments, then gave the results on the seven lots of steers being fed at the farm. On these steers the cheapest lot needs a $7.46 selling price per hundred weight to break even.

The afternoon session consisted of two general discussions on the market situation. Mr. J. T. Alexander, of Chicago, and Mr. J. S. Taylor, of Indianapolis, presented papers on the market situation which were read by Mr. King. Director G. I. Christie of the Experiment Station outlined in a general way the plans of the Station for the future. J. E. Poole, of the Live Stock Exchange of Chicago, in the last address of the day, outlined the trend of the market and gave a discussion of the causes.

The attendance at the convention was much larger than was hoped for considering the busy season. The officers of the association look forward to an even larger meeting next fall.

DR. CARR SPEAKS BEFORE AMERICAN CHEMICAL SOCIETY.

Dr. R. H. Carr, of the Ag. Chemistry Department, left for Rochester, N. Y., April 25, and spoke before the American Chemical Society at its semi-annual meeting. His subject was "What Puts the Pop in Popcorn."

Admirers of the Purdue Band will be pleased to know that they will have the opportunity to hear the organization at the State Fair next fall.

The annual exchange program and banquet with Illinois took place April 19th. Fourteen men from Illinois University furnished the program for the evening. Purdue sent four men to Illinois to represent the society.

Poultry Extension Work in Indiana

By LeRoy L. Jones,
Extension Poultryman, Purdue University.

THE job of the Poultry Extension Department of a University is to try to help improve poultry and methods of poultry management in its territory. In Indiana this job is largely work with farm poultry—an endeavor to help make more money from the farm hen, without increasing the labor involved.

The Poultry Department of Purdue University has done poultry extension work every since the organization of the department, but not until about 1915 was this work placed on such a basis that the whole time of one or more men was devoted to it. The work the first few years was of a miscellaneous nature. No road was definitely mapped out. Only a few county agricultural agents were in existence in Indiana—and they were not altogether sure just what they were supposed to do. Indiana farmers were not organized as they are today.

Early Work of Department.

The first tasks attempted in poultry extension work were three. In the winter one man took an educational exhibit around to various county poultry shows, while another talked about chickens at the Farmers' Short Courses held over the State. In addition a few farmers over the State were persuaded to keep financial records of their poultry work, and these farmers were visited four times during the year.

The time not spent with the above three projects was devoted to miscellaneous work. If Farmer Jones had a number of sick chickens, an extension poultryman went down to his farm to help him if possible, or at least to console with him. If a farmers' club wanted a speaker, an extension poultryman lugged along a stereopticon lantern and a bunch of lantern slides and gave an "illustrated lecture." If a county agent wanted to hold an "organization" meeting and wanted to get the farm women to attend, he sent for an extension poultryman, in hopes that the women would come out to hear the poultry talk.

All this work has its place, but today it is not sufficient. This old line of miscellaneous work cost money, yet when at the close of the year an accounting was asked for, about all that could be reported was a certain number of miles traveled, so many talks given to a certain number of people, and so many farms visited. To say definitely that any results had been secured was almost impossible.

Modern Methods.

The past few years have brought many changes, such as county agents, war, farmers' organizations, labor troubles, fluctuating prices, good times and bad times. To be efficient all work must be organized. To prove that poultry extension work is efficient, definite results must be shown. How this is being attempted can best be illustrated by telling of the poultry extension work in a certain community in central Indiana.

Let us call this community Blue Creek township, for the example might be taken in any of several different counties. The people of this township are good, progressive farmers, nearly all of them keeping a few hens. Not many of them are at all interested in poultry raising except as the hens are "tolerated" because the women want them and they do help with the household expenses.

The first step in developing real poultry work in this community is to hold one or more poultry culling demonstrations in it. These not only prove that many unprofitable hens are being kept, but bring out many questions concerning housing, feeding and other poultry problems. People are taught to see hens as individuals rather than as flocks.

The next step is a natural outgrowth from the culling. Many want to know just what their hens are doing, so the Purdue University Extension Department, in cooperation with the county agricultural agent, provides monthly record cards to those of the community who will keep egg records for a year. On these cards the number of eggs gathered each night is put down, and at the close of the month the number of hens is recorded, and the card sent in to the county agent. The county agent tabulates these records from the various farms and reports back to the record keepers, so that at the close of the year each record keeper knows—not guesses—

just what his own flock has done, and how it has compared with his neighbor's.

In connection with this record work, community meetings are held about every three months. At these meetings seasonal poultry problems are discussed, with an extension poultryman from the University to lead in the discussion. A monthly poultry letter, containing seasonal suggestions, is also sent to each co-operator by the University.

After the culling demonstrations have been followed by a few months of egg record keeping, at least one farm can be found in the community which is doing exceptionally well with their poultry, and which is willing to keep a complete book account with their hens. Such a farm is termed a "Poultry Demonstration Farm" and is visited regularly by a Purdue Extension poultryman. The records from this farm are a real proof to the community of the value of farm hens well cared for, and the methods used will usually bear copying. A poultry survey of the community, made every year or two, shows that surrounding farms are watching carefully the demonstration farm, and are copying the good features of their work.

Pedigreed Flocks Possible.

One further step is contemplated. It is planned to send five or ten selected hens from each of these demonstration farms to Purdue University to be trap-nested for a year. In the spring these hens will be mated to the best males which can be obtained, and from this mating pedigreed chicks will be returned to the demonstration farm. At the end of the year all of these hens which lay over a certain number of eggs will receive a "diploma" and be returned to their owner. There will thus be placed in each of these communities a few hens of proven record, and pedigreed chicks (both cockerels and pullets) from them—the foundation for real bred-to-lay stock.

This trapping and certifying of hens will involve only a slight expense to the owner, but considerable expense to Purdue University Poultry Department. The funds available will not permit the starting of such work until the fall of 1922, when it is hoped to have buildings available.

All this work is progressive. It is along organized lines. It proves its value as it goes. It has visible results.

SUMMER FORAGE FOR HOGS.

By E. R. Harvey, '23.

IN a community in the east-central part of Indiana lives a farmer who is not famous for his extensive farm operations or incessant toil, although he is a worker, but for the fact that he can turn small capital into greater profit than any of his neighbors. It is indeed a point of discussion in that community as to how this man, Frank Lynch, can bank the money that he does, remodel his home, rebuild the barn which he lost in a fire and provide his family with the luxuries we all desire.

Hearing this discussion I visited his farm to get his story of success. He did not have better land than his neighbors, or more land than the average farm, his luck as a salesman was apparently not better than that of some of the close trading farmers found in any enterprising community. Hogs provided his chief cash income. They were nearly always fed on the crops produced on the farm until marketed without buying corn or other commercial feeds. He did buy middlings for his little pigs in order that they might start eating at the earliest possible age, thus taking advantage of early growth.

I attended a farmers' meeting with him one day not long after this. While there one of his neighbors who appeared rather worried and worn opened this conversation. "Why is it," this man asked, "that although I have as good a farm and as good a helpmate as you, I am able to furnish my family with only the bare necessities of life?" Jones immediately suggested that his difficulty lay in the fact that he allowed his chief income, namely, his porkers, to grow themselves instead of pushing them. His friend appeared puzzled and a little irritated at the suggestion that he was not a good feeder, for he prided himself on this point. He observed, however, that Mr. Lynch had something else in mind and bade him continue.

"To begin with," Lynch said, "I have observed that as early as possible in the spring you turn your milch cows and horses along with your brood sows and spring pigs in on your only pasture which is consequently nearly gone by June. Another thing, your pasture is entirely blue-grass, which is indeed good for horses but for hogs it is, unless very carefully managed, a mediocre

crop. That lot just back of your barn has the blue-grass worn out and is almost useless. Since it contains between six and seven acres, by dividing it so as to furnish alternate pastures and seeding it to oats and rape, you can easily furnish abundant forage crop for your entire herd of hogs. That rye that you have sown will make excellent early pasture and if used in this manner until it starts jointing it will not be depreciated for threshing. You had not thought of using it, but by being careful not to turn stock on it when the soil is very muddy no serious damage to the soil will result. This will provide you with forage from what has been practically useless heretofore up until fall.

"You practice hogging down corn just as I do with one exception. That is, supplementing the corn. At the last cultivation I sow cowpeas between the rows and they are both harvested together. The cowpeas furnish the necessary constituent protein in which corn is deficient. The cowpeas are also a legume which enrich the soil at the same time that they furnish feed.

"This does not imply that such a program should be followed entirely or that it is always most profitable. Clover which we include in our rotations is often uncertain and the times when a good stand is secured it is natural that we would want to save the early crop for hay and the second one for green-manuring. Oats may be substituted or used with rape as an early pasture, while rye and soybeans are often very desirable as fall forage crops.

"In this manner I have excellent forage throughout the growing season at a relatively small cost. My cattle and horses have enough pasture throughout the summer without robbing the rest of the live stock. By this systematic growth of forage crops I believe that my saving in grain is at least one-fifth. My hogs are healthier and ready for market at an earlier date. In my estimation these methods would change your meagre income to a more satisfying bank account. Isn't it worth trying?"

EXPECTS, IS RIGHT!

An optimist is a man who expects to raise vegetables like those pictured in the seed catalogues.

PLANNING SUMMER MENUS.

WARM weather does not work the havoc among older children and adults that it does in the case of babies, but it does render everyone more or less susceptible to nutritional disturbances and it is well to remember this in planning the summer diet. With warm weather comes a muscular relaxation reacting on the digestive tract as well as on the rest of the body, and calling not only for a lessened amount of food but also for those foods which are most likely to prove to be easily digested.

Following are a few general rules to be observed: Avoid such foods as those rich in fat, hot breads, which, especially with syrups and honey, are liable to fermentation, and those protein foods most deserving the term "heating food." In their stead serve fresh fruits and vegetables, especially the green leafy vegetables which contain mineral matter and furnish bulk to the diet. If meat is desired often in the diet, serve occasionally a light meat, such as lamb or mutton, which satisfy the desire for meat but are not as "heating."

A general plan showing foods suited to each day's menu is given as follows:

Breakfast plan—

1. Fruit.
2. Cereal.
3. Some kind of bread.
4. A hot drink.
5. (Some tissue building food as eggs or meat if so desired.)

Dinner plan—

1. One meat dish (eggs may be substituted.)
2. One starchy vegetable.
3. Some kind of bread.
4. One green vegetable.
5. One simple dessert after heavy meal.

Supper or luncheon plan—

1. One hot dish such as meat or meat substitute.
2. Some kind of bread.
3. Some vegetable if desired.
4. Some simple dessert.
5. Preserves or jelly if so desired.

Not the least problem for the housewife in summer is to get up a meal appetizing enough to satisfy her family, and at the same time involving a minimum of time spent over the stove, at least during the

heat of the day. Using fresh fruits in season instead of so much pastry is one way, but the greatest help is the fireless cooker. The mid-day meal may be planned so that the hot dishes for that meal may be prepared early in the morning and placed in the fireless cooker until time to be served.

Following are suggestive menus for several days:

Sunday.

Breakfast—Shredded wheat biscuit with strawberries, milk, sugar; bacon, eggs; toast, butter; coffee or cocoa.

Dinner—Fried chicken, mashed potatoes, cucumber salad, buttered beets, creamed string beans, bread and butter, berry shortcake, whipped cream.

Lunch or supper—Cold ham, potato salad, bread and butter, iced tea, vanilla ice cream, devil's food cake.

Monday.

Breakfast—Oatmeal, milk and sugar; omelet, toast and butter, coffee.

Dinner—Broiled ham, mashed potatoes, milk gravy, cold slaw, bread and butter, apple pie, cheese, coffee.

Supper or lunch—Cold tongue, creamed potatoes, beet greens, bread and butter, watermelon, iced tea or milk.

Tuesday.

Breakfast—Grapefruit, sausage, potatoes, muffins and butter, coffee or cocoa.

Dinner—Pork tenderloin, glazed sweet potatoes, corn on cob, milk gravy, swiss chard, bread and butter, peach shortcake.

Supper or lunch—Waldorf salad, scalloped potatoes, bread and butter, black raspberries with cream, iced chocolate.

Starting The Alfalfa Crop

By H. Q. Holt, '23.

ALFALFA is the most valuable forage crop grown for the feeding of most farm animals. Like clover, it contains a high degree of that most important element of food, protein, which goes to make both bone and muscle. In fact, the feeding value of alfalfa is more than double that of timothy, is almost equal to wheat bran, and is the equal of shell corn. It is highly palatable to practically all farm animals and can be raised at an average cost of less than five dollars a ton.

The farmer must bear in mind that alfalfa is not only valuable because of its food nutrients, but also because it is a soil renewer; adding nitrogen and also bringing soil minerals from lower layers of the soil by the assistance of its deep rooting system. The roots not only bring the soil minerals from the subsoil which is beyond the reach of ordinary plants, but also add humus, lighten the soil, and improve its structure.

Thus it is seen that alfalfa is a paying crop, and if the following suggestions are carefully followed there is no need of failures in attempting to grow it.

Preparation of the Seed Bed.

The seed bed should be carefully prepared by plowing as soon as possible. It is a good plan to practice summer fallowing, keeping the soil packed and in a mulched condition by frequent harrowings.

Every alfalfa field should be started with a liberal dressing of stable manure, free from weed seed, and should be reinforced by a high grade phosphate. (Many experiments have shown that there is little need of a special inoculation when plenty of stable manure has been used.) The kind of a fertilizer to use depends entirely upon the character of the soil, but a straight phosphate will pay best for ordinary soils. From 300 to 500 pounds per acre of acid phosphate or steamed bone may be used with every assurance of large returns.

It is usually best to inoculate. The upshot of practical experience in the United States has been that the use of pure cultures, that is, inoculation by the use of the bacteria that have been commercially grown in laboratories, is attended with much uncertainty, and that the simplest, surest, and most economical method of inoculation is by means of well infected natural soil, collected where the proper bacteria are found in abundance (as shown by the tubercles on the roots of the plants) and scattered over the field to be seeded at the rate of one hundred pounds or more per acre. But in ordinary cases the soil from a sweet clover field will give good results.

Time and Rate of Seeding.

After the soil is ready and the seeds have been tested, they may be sown at the rate of fifteen pounds per acre. Older growers whose soils have been inoculated for alfalfa may sow ten or twelve pounds per acre. The best time for seeding alfalfa is in dispute, but if the weather is favorable and the soil is in good condition and reasonably free from weed seeds, good results may be secured at any time from February until August. Some successful alfalfa raisers insist on spring seeding with a thin nurse crop of barley. Others pin their faith on summer seeding without a nurse crop, while there are some venturesome growers who have tried winter or early spring seeding on rye or wheat just as they sow clover, and have been successful. The experiments that were conducted by the Soils and Crops Department of Purdue University have shown that seedings made in April or May, either alone or with a nurse crop, have been most liable to failure. Thus, it seems as if the better time for sowing the seed has not been definitely decided upon, but one may feel reasonably safe in seeding from the first to the middle of August immediately after a rain.

Do not expect the alfalfa to do well on soils that are not fit to produce other crops profitably. There is just as much need for care in selecting and preparing soils for alfalfa as for any other crop. It is desirable to place the alfalfa field where there is a deep, loamy soil, but there is, however, plenty of data to show that alfalfa can be grown on almost any type of soil providing that it is well drained, sweet, and properly supplied with organic matter and other plant food.

Common Causes of Failure.

According to Professor Fisher, head of the Agronomy Department at Purdue University, the six causes for failure to grow alfalfa successfully may be classed under the following heads:

(1) Land not properly drained.
(2) Land is sour (lack of lime).
(3) Lack of inoculation.
(4) Lack of fertility in soil.
(5) Lack of good seed.
(6) Lack of proper preparation of the seed bed.

After the alfalfa field is once started do not disturb the young plant as long as it is doing well and does not bloom. Generally speaking, clipping should not be practiced only when the growth seems checked, or the tops of the plants turn yellow.

YOUR SOIL NEEDS IT—

Don't Deprive It of the Necessary

What does your soil need? Fertilizers, you know it, of course you do, and you buy it. You are the man we are looking for. We want YOU to buy OUR fertilizer. You will want our fertilizer. Learn to know us.

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Manufacturers of High Grade Fertilizers, Digester Tankage, Cut Meat and Bone, Raw Ground Bone.

THE CHINCH BUG—A SERIOUS WHEAT AND CORN PEST IN INDIANA THIS YEAR.

(Continued from page 401)

Two points in the life history are of great importance in the control of the chinch bug. First, as a rule, the bugs are not mature by the time conditions drive them from the grain field and, consequently, they travel on foot from the wheat to the corn. Second, the bugs hibernate in old trash, woods, leaves, bunch grass, fence rows or other protective places.

Control.

Four methods of control are recognized, each important according to time and conditions. These are: 1, Burning the bugs during the winter months in their hibernating quarters; 2, use of barriers to protect adjacent corn fields and to destroy the insects as they leave the grain fields about harvest; 3, spraying with a contact insecticide to destroy the bugs on corn when the barrier bands have been neglected; 4, rotation and use of resistant varieties.

Of these the first two are by far the most important and most logical controls. The first, namely, burning in winter quarters, is not treated here since this is obviously out of the question for the present season. Absolute protection can be obtained by barrier bands properly prepared and maintained and the farmer should know in advance the best method of placing the barrier in order that he can, if needed, construct it with the least possible delay.

Barriers are of three types:

1. Creosote lines, which protect by repelling the bugs.

2. Coal tar and oil lines, which are physical barriers.

3. Dusty furrows, which are merely mechanical barriers.

Of these, creosote is the more widely used and has given excellent results in Indiana. Plow a furrow, throwing the dirt away from the wheat around the wheat field, about the time the wheat begins to ripen, and in the bottom of this furrow dig post holes twenty to thirty feet apart and fifteen to eighteen inches deep. These post holes should be cut away around the top, giving them a distinct slope, these slopes being covered with road dust to assist the bugs in falling into the holes. Have a good grade of creosote in readiness and when the chinch bugs begin their migration, apply this to the brow of the furrow ridge on the wheat side. The creosote may be easily applied by making a hole with a six-penny nail in the side and near the bottom of a galvanized tin bucket and walking along the side of the barrier, directing the stream on the same place at each application. The creosote must be renewed once a day as the odor which prevents the bugs from passing over must be maintained. A fifty gallon barrel of creosote will be required for each half mile of barrier maintained for the entire period during which the bugs are leaving the wheat stubble.

Creosote for barriers should be of a heavy nature and possess sufficient body. The F. J. Lewis Co. "Chinch bug oil" has proved very satisfactory in Illinois. Other good grades of crude creosote may be secured from The Barrett Co. of Chicago and The American Tar Products Co. of Chicago.

Coal tar, when available, may be used in much the same manner as creosote, but the ground on which it is poured should be nearly level and compacted as firmly as possible, and a larger quantity will have to be applied as this is strictly a physical barrier. In some portions of Indiana coal tar is easily secured and in many cases is as economical and effective as creosote.

In combating the chinch bug little progress can be made by the efforts of the individual. Not until Indiana farmers recognize the problem and co-operate in their efforts, can the ravages of this insect be completely checked within the State.

In Boston they are making milk out of oats, peanuts, water and salt. Given the same ingredients a cow can do the same thing in a much better way.

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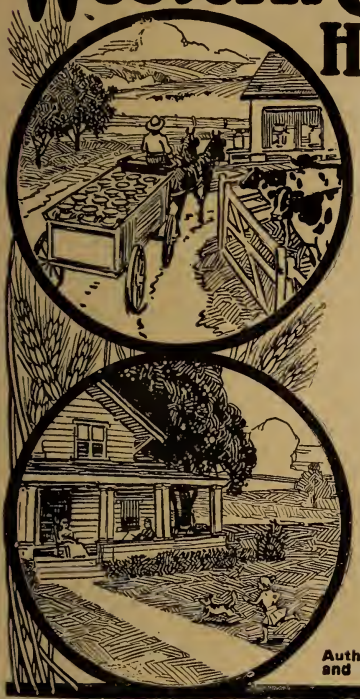

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INSECTS LIKELY TO BE ABUNDANT THIS YEAR; CAREFUL WATCH ADVOCATED

By R. L. Fosbrinck, '22.

Hessian flies were noticed in abundance this spring, and while we may expect some assistance from the parasites it will be necessary to sow late this fall and take such other precautions as may be expedient. The sudden weather changes this spring at a time when the spring brood of flies were issuing and laying eggs have been rather unfavorable to the Hessian fly.

Every farmer should familiarize himself with the pale tan colored army worm moth, and if they are noticed exercise special watch for the worms. These worms should be controlled with poison bait before they do any appreciable damage.

The codling moth will probably start emergence before the middle of May in the locality of Lafayette. Since egg-laying depends on temperature and weather conditions it is not possible to state the exact egg-laying dates. However, if the temperature and weather conditions are normal the egg-laying may start in three to five days. When these eggs hatch it is time for the second spray, the first having been applied just after the petals fell. To insure control the spray should be kept on the entire growing season. It is not advisable to curtail orchard spraying operations this year for, although the protection of fruit this year will not compensate the cost, the importance in protecting future crops by proper spraying this year is self-evident to any experienced fruit grower.

It would be profitable in many cases for the farmer to take time off to walk over his various clover, wheat, and alfalfa fields and make a thorough search for the presence of any insect pests.

Information will be furnished by the Department of Entomology of the Experiment Station later in the season, further advising the farmers as to the precautions to be followed.

BETTER DAIRY CATTLE, THE HOPE OF AMERICA.

(Continued from page 398)

to buy pure-bred cows we must get this 3⅛ per cent in the best manner possible. And in order to do this we must save only the calves from the best cows. And to know which are the best cows we must test. The average farmer will not take time to test his cows, so the only alternative is the cow testing associations. These have raised the production of Denmark to 275 pounds in twenty-five years, why will they not give good results for us? Then if you know which are the best cows and breed them to a good bull there is only one thing in breeding that can keep the offspring from being good and that is environment.

Environment, what is it? Environment is the conditions which surround the young in its prenated state and for a few months following its birth. Environment is controlled by two factors, food and living conditions. In order to reach the maximum efficiency the environment should be the best possible, both as to food and living conditions. In order to be a large producer a cow must have size. So if the cow is not properly fed both before and after the calf is dropped, the calf can not be as strong and healthy as if the cow had been properly fed. Then the calf must be well fed after

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birth so that it will get a maximum growth and mature early into a profitable cow.

Then the second point in environment is living conditions. In order that the fetus may be properly developed the cow should not be exposed to undue hardships. She should not be compelled to stand in the cold or rain, but should have a warm, dry place to stay, with an abundance of fresh air and sunlight but no drafts. If the herd is tuberculin tested another dangerous factor is removed. Not only before the calf is born, but also afterwards should these conditions be looked after closely for the first months are important ones in the calf's life.

Then in summarizing, there are just three points to watch: first, use the best sire possible and if there is not one in your neighborhood, get one; second, test your cows and save the offsprings of the best cows; and, third, have the best environment possible.

But the best bred cow in the world would not produce very well if she was not properly fed. Would Plain Mary, Countess Prue or Duchess Skylark Ormsby have made their world's records under ordinary farm care? No, it would have been impossible. So in connection with better breeding we must also have better feeding.

First, obtain some good feeding book such as "Henrys' Feeds and Feeding" and learn the composition and use of the various feeds. Then go to the barn and study the needs of each individual cow. Study her likes and dislikes, for in this way only can you obtain the maximum production because cows are individuals just the same as you or I.

If we were to go into a restaurant and order our breakfasts you might order eggs while I would order puffed wheat. They might contain the same food value and cost the same, but our individual tastes are different. So are the cows. She must be fed with both knowledge and intelligence as well as by study and observance.

Not only must your cows be well fed, but the rest of the herd should also be well fed. The bull should be well fed to insure a strong vitality. The calves should be well fed so that they may get as large a growth as possible. The heifers should be well fed so that they are in good condition at freshening time. In fact, every member of the dairy herd should be well fed and cared for.

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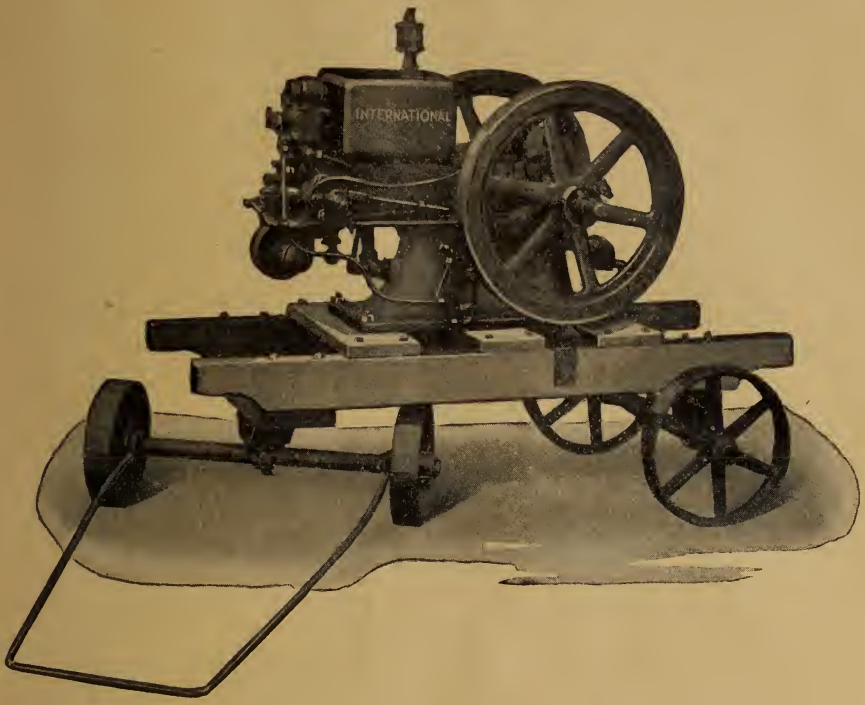

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